APPENDIX

CATALOG CUTS

```
Pumps
     gneumatic Air Driven Pumps (EW's)
     Collection Trench Pump - Submersible Type - (CTP-1)
     Effluent Pump - Centrifugal Type - (EP-1)
    Sludge Fumps - Air Diaphragm Type - (SP-1 & 2 and ADP-1 & 2)
    Feed Pumps - Centrifugal Type - (FP-1 & 2)
     Sand Filter Pumps - Centrifugal Type - (SFP-1 & 2)
     Tray Aerator/Discharge Pumps - Centrifugal Type - (DP-1 & 2)
     Sump Pump - Submersible Type - (SP-3)
    Backwash Pumps Gentsifugal Type (RWP-1 £ 2)
Tanks
    - Hydropneumatic Tank - (NonPot)
    Tanks - FRP - (T-1 7000g flat bottom vented to atmosphere; T-2 1000g flat
bottom open top; T-3 1000g Cone bottom open top; T-4 2100 g flat bottom open
top)
Granular Activated Carbon
     Liquid Phase GAC - 2000 lb units - (LGAC-1)
     Vapor Phase GAC - 1800 lb units - (Future)
Air Stripper
   · Tray Aerator
     with Blower and Discharge Pumps - (TA-1)
Chemical Precipitation Units
     Pre-packaged Chemical Precipitation Units - (CP-1)
     with all appurtenances such as chemical feed systems and monitoring
Pressure Filters
     Polishing Pressure Filters - (PF-1)
     with backwash pumps
Filter Press
     Plate Filter Press - (PFP-1)
Misc.
     Flowmeters
     Level Switches
```

Cleanup Functions ATAILS

RED Ground Water Specialists

Ann Arbor Michigan 1-800-6

, SOLOH

ı -800-624**-20**2

AR309309

55" (152 cm) HammerHead 4"

•	H4 Series Bottom Inlet	H4 Series Top Inlet	Short H4, Top Inlet
Model No.	H45SSB, H45SEB, HF45SSB, HF45SEB	H45SET, HF45SET	HF43SET
Pump Type	Positive Air Displacement	Positive Air Displacement	Positive Air Displacement
inlet	Bottom	Тор	_ Top
O.D.	3.5" (89 mm)	3.5* (89 mm)	3.5" (89 mm)
Length	55" (140 cm)	60" (152 cm)	42" (105 cm)
Weight	23.5 lbs. (10.7 kg)	24.0 lbs. (10.9 kg)	16.0 lbs. (7.3 kg)
Materials	Stainless steel construction, with Teflon [®] inlet and discharge check balls, stainless steel or epoxy float, Viton O-rings	Stainless steel, Q-Tal & brass construction, with Teffon [®] inlet and discharge check balls, epoxy float, Viton O-rings	Stainless steel, Q-Tal & brass construction, with Teflon [®] inlet and discharge check balls, epoxy float, Viton O-rings,
Fittings:Type	Standard—Barb Optional—Quick Connects	Standard—Barb Optional—Quick Connects	Standard—Barb Optional—Quick Connects
Sizes: Liquid Discharge	3/4" (19 mm) O.D. (H45SSB, H45SEB) or 1-1/4" (32 mm) O.D. (HF45SSB, HF45SEB) tubing standard*	3/4" (19 mm) O.D. (H45SET) or 1-1/4" (32 mm) O.D. (HF45SET) tubing standard*	1-1/4" (32 mm) O.D. tubing standard*
Air Supply Exhaust	3/8" (9 mm) O.D. Tubing 1/2" (13 mm) O.D. Tubing	3/8" (9 mm) O.D. Tubing 1/2" (13 mm) O.D. Tubing	3/8" (9 mm) O.D. Tubing 1/2" (13 mm) O.D. Tubing
Pump Stroke	0.8 gal. (2850 ml.)	0.8 gal. (2850 ml.)	0.32 gal. (1200 ml.)
Operating pressure range	10-160 psi (70-1,100 kPa)	10-160 psi (70-1,100 kPa)	10-160 psi (70-1,100 kPa)
Maximum lift	300 ft. (90 m) •	300 ft. (90 m)	300 ft. (90 m)
Maximum flow rate	14+ GPM (54+ LPM) HF45SSB, HF45SEB	11+ GPM (41+ LPM) HF45SET	10 GPM (38 LPM)
Minimum submergence	42" (107 cm) above pump bottom	Top Inlet Port————————————————————————————————————	Top Inlet Port— 38" (97 cm) above bottom of pump
Density of pumped liquid	1.0 g/cc (stainless float); 0.7 g/cc up (epoxy float)	0.7 g/cc up	0.7 g/cc up
Cap sizes**	4", 6", and 8" (100, 150, & 200 mm) diameter (standard and vacuum seal)	4", 6", and 8" (100, 150, & 200 mm) diameter (standard and vacuum seal)	4", 6", and 8" (100, 150, & 200 mm diameter (standard and vacuum se.

**ONote: Pumps are available with tubing or hose; quick disconnect fittings are available on request. Hose sizes are: 1" (25 mm) I.D. discharge, 3/8" (9 mm) I.D. air supply, 3/8" (9 mm) I.D. exhaust.

(152 mm)

^{**} Special caps available.

JACKETED TUBING OR OPTIONAL HOSE SETS

Model

Description

Discharge O.D.

Air Supply O.D.

Min. Bend Radius

†Max. Cont. Length

Exhaust O.D.

Bubbler O.D.

Max. Pressure

QED's exclusive Jacketed Tubing, with a continuous nylon sheath, helps prevent hangups and loops, makes installation easier (especially in narrow or obstructed casing), and is lightweight with exceptional chemical resistance, outside and in.

Tubing sets are supplied cut to custom lengths. Jacketed tubing and sheath are both Nylon 12, which doesn't swell in water and provides excellent resis-

tance to most liquids and cleanup conditions, including hydrocarbons, fuels, and alkalies. For extremes of acidity, consult QED for alternative.

Two tubing packages are available for H4 series pumps. The standard SPTUBE provides flow rates up to 8 GPM with H45SSB, H45SEB, and H45SET models. The high flow MAX-TUBE increases maximum flow up to 14+ GPM with HF45SSB, HF45SEB, and HF45SET pumps. The MINTUBE set serves

both H2 series pumps. Hoses and quick-connects are available for all models, including the short-body HF43SET (see "Accessories" for details).

All HF4 pumps

PUMP MODEL

H23SEB, H24SET

H23SEB, H24SET

H45SSB, H45SEB, H45SET

H45SSB, H45SEB, H45SET

H45SSB, H45SEB, H45SET

HF45SSB, HF45SEB, HF45SET

HF45SSB, HF45SEB, HF45SET

HF45SSB, HF45SEB, HF45SET



Contains 4 tubes-

and bubbler tubing*

discharge, ex-

3/4" (19 mm)

1/2° (13 mm)

3/8° (9 mm)

1/4" (6 mm)

7" (18 cm) ·

200' (60 m)

8" (200 mm)

WELL DIAM.

2" (50 mm)

4" (100 mm)

4" (100 mm)

6* (150 mm)

8" (200 mm)

4" (100 mm)

6" (150 mm)

8" (200 mm)

325 psi (2,250 kPa)

haust, air supply,

SPTUBE



MAXTUBE

Contains 3 tubes

and air supply

1-1/4" (32 mm)

1/2" (13 mm)

3/8" (9 mm)

12" (30 cm)

150' (45 m)

MAXTUBE

MINTUBE

MINTUBE

SPTUBE

SPTUBE

SPTUBE

MAXTUBE

MAXTUBE **MAXTUBE**

DESCRIPTION

165 psi (1,150 kPa)

discharge, exhaust



MINTUBE	•
Contains 3 tubes—	_
discharge, exhaust,	
and air supply	
1/2" (13 mm)	
3/8" (9 mm)	
1/4" (6 mm)	
6* (15 cm)	
· · · · · · · · · · · · · · · · · · ·	
360 psi (2,500 kPa)	
250' (75 m)	

*Bubbler tubing is used for referenced depth measurement. More information on this is supplied with custom wellhead completion packages.

† These are maximum lengths that can be shipped via UPS. For longer continuous lengths, consult QED.

HAMMERHEAD CAPS AND ACCESSORIES

NOTE: each cap, flange and accessory kit comes with an illustrated instruction sheet.

STANDARD	(SLIP-FIT) CAPS		
MODEL**	PUMP MODEL	WELL DIAM.	DESCRIPTION
32M	H23SEB, H24SET	2" (50 mm)	MINTUBE
84M	H23SEB, H24SET :	4" (100 mm)	MINTUBE
848	H45SSB, H45SEB, H45SET	4" (100 mm)	SPTUBE
S6S	H45SSB, H45SEB, H45SET	6" (150 mm)	SPTUBE
583	H45SSB, H45SEB, H45SET	8" (200 mm)	SPTUBE
S4L #	All HF4 pumps	4" (100 mm)	HOSĘ
S6L ‡	All HF4 pumps	6" (150 mm)	HOSE
S8L #	All HF4 pumps	8* (200 mm)	HOSE
S4X	All HF4 pumps	4" (100 mm)	MAXTUBE
S&X	All HF4 pumps	6° (150 mm)	MAXTUBE



Vacuum Caps

"Add F after Model Number to include Filter/Regulator/Gauge with cap. # Hose option to be sold with support line (cable or rope).

			_
ACC	FSS	CRIF	2

VACUUM CAPS

MODEL **

S8X

V2M

V4M

V4S

V6S

V8S

V4X

V6X

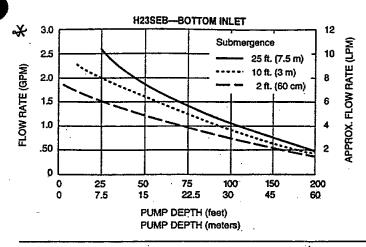
X8V

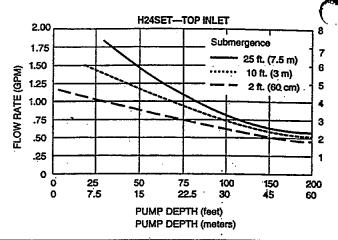
700500	4150				
MODEL	PUMP MODEL	DESCRIPTION	MODEL	PUMP MODEL	DEŞÇRIPTION
37000	All Models	Pump Cycle Counter (for Flow Totalization)	37058	H4 Series	Kit - Cable Attachment
L374	All Models	Tank Full Shutoff	37060	H4 Series	Cable - 3/16" (5 mm) S.S order by ft.
37050	H4 Series	Kit - Regulator/Gage - H2, H4, Solo II	37207	H4 Series	Rope - 3/8" (9 mm) Polypro order by ft.
KIH2ST	H23SEB	Kit - Top Inlet Conversion - H2	37212	H4 Series -	Cable Sling Assembly
KIH2SB	H24SET	Kit - Bottom Inlet Conversion - H2	37216	HF4 Series	Hose, - 1" (25 mm) I.D. Discharge (Black)
JH4ST	H4 Bot, Inlet	Kit - Top Inlet Conversion - H4	37217	HF4 Series	Hose - 3/8" (9 mm) I.D. Air Supply (Red)
KIH4SB	H4 Too Inlet	Kit - Bottom Inlet Conversion - H4	37218	HF4 Series	Hose 3/8" (9 mm) I.D. Exhaust (Gray)
CH52	H4 Bot, Inlet	Can - 2' (60 cm) Length (Leachate)	37208	HF4 Series	Kit - Quick Connect - Discharge/Air Supply -
95067	H4 Series	HammerHead O&M Manual	37209	HF4 Series	Kit - Quick Connect - Discharge/Air Supply -
95081	H2 Senes	HammerHead O&M Manual	36824	All Models	Flow Throttle Valve
SPTOOLS	All Models	Clamp Tool, Tube Cutter			AR3093

HAMMERHEAD FLOW PERFORMANCE CURVES

H2 SERIES

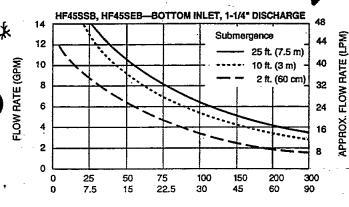
100 psi (700 kPa) drive air pressure was supplied for all pump depths.

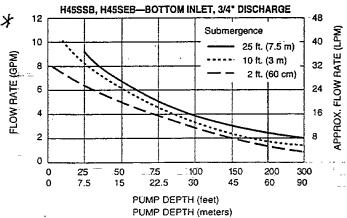




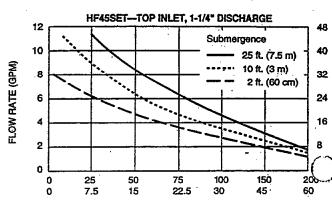
H4 SERIES

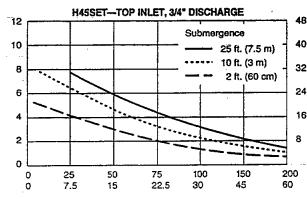
100 psi (700 kPa) drive air pressure was supplied for all pump depths less than 150 feet (45 meters); 160 psi (1,100 kPa) drive air pressure was supplied for all greater pump depths.

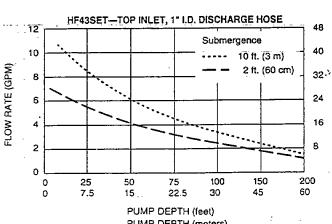




NOTE: Pump depth is measured down from the top of the well casing to the top of the pump fittings. Submergence is measured up from the lowest inlet point on the pump inlet to the top of the static water or product in the well.







PUMP DEPTH (meters)

FLOW RATE (GPM)

A-125 AR309312

HOW HAMMERHEAD PUMPS WORK

- Each HammerHead pump requires a certain minimum depth of liquid to operate (to raise the float high enough for actuation)—26" to 58" above the bottom of the pump, depending on model.
- Pumps shut themselves down when the liquid is pumped below this level, conserving air, and will begin running again automatically when well levels recover.

LIQUID DISCHARGE	
EXHAUST —	
HAMMER DRIVE MECHANISM	
DISCHARGE TUBE	
•	

PUMP FULL-FLOAT UP-PUMP ON

Float in this position slides actuator rod upward, triggering Hammer Drive mechanism and causing air to enter the pump. The magnetic Hammer Drive provides positive-action air valve operation for consistent performance, no matter how rapidly or slowly the pump fills.

Incoming air pressure seats the inlet check ball, keeping liquid from leaving through the inlet. Liquid in the pump body is forced past the discharge check valve and up into the discharge tube to the surface.

FLOAT IN UP POSITION

ACTUATOR ROD -

FLOAT IN DOWN POSITION

PUMP EMPTY—FLOAT DOWN—PUMP OFF

Float in this position slides actuator rod downward, shutting off the air supply and allowing the compressed air in the pump to vent. The inlet check ball unseats (no longer having any pressure holding it down), which allows the next fill of liquid from the well into the pump. The discharge check ball is seated by the weight of liquid in the discharge tube above it, preventing that liquid from falling back into the pump body.

As the pump refills, the float rises back to the top and the cycle is repeated.

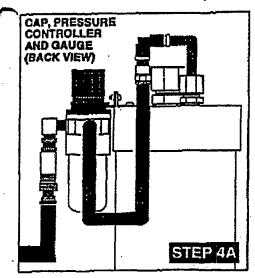
DISCHARGE CHECK BALL

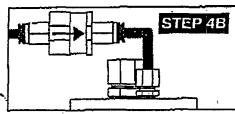
INLET CHECK BALL

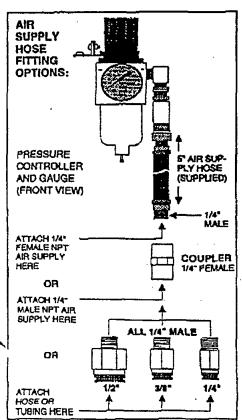
PUMP INLET

INLET SCREEN

NOTE: Remaining steps are identical for both models







STEP 3. Install Pump in Well

- A. Lower pump to desired depth.
- B. Once pump depth has been determined, measure off approximately 1 ft, of tubing length (measured from the top of well casing) from the pump exhaust line.
- C. Cut exhaust line.
- D. Attach the pump exhaust deflector (included w/caps) to the pump exhaust line. (See clamp instructions on page 8.)
- E. Pass pump discharge and air supply lines through the well cap: place well cap on casing.
- F. Re-adjust pump to desired depth.
- G. Cut air supply and discharge tubes to desired length.
- H. Tighten fittings down onto skidischarge lines.

STEP 4. Connect Air Supply and Discharge

A. If optional pressure regulator is used, connect short (~1 foot) hose from regulator to pump air supply line with attached push-on elbow; attach 5' flexible hose to quickconnect fitting on regulator and to air supply line from compressor. See illustration for air supply hose litting options.

OR

- B. If optional pressure regulator is not used, connect air supply line from compressor directly to pump air supply line above well cap (fittings and coupler for 3/8" and/or 1/4" connections). Make sure arrow is pointing in direction shown.
- C. Connect pump discharge tube to discharge header. (Barb and clamps supplied with cap.)

STEP 5. Set Air Pressure

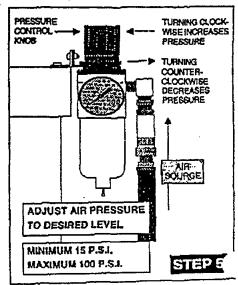
NOTE: Flow Rate is dependent on the amount of air pressure that is received by the

pump. Flow rates can be increased by increasing air pressure to the pump or decreased by decreasing air pressure to the pump. For satisfactory performance, pressure should be set at or above 1 psi for every 2 feet of total discharge head—i.e., a pump with T.D.H. of 200' would require 100 psi to pump effectively.

 A. Adjust air pressure to desired level at compressor—minimum 15 psi, maximum 100 psi.

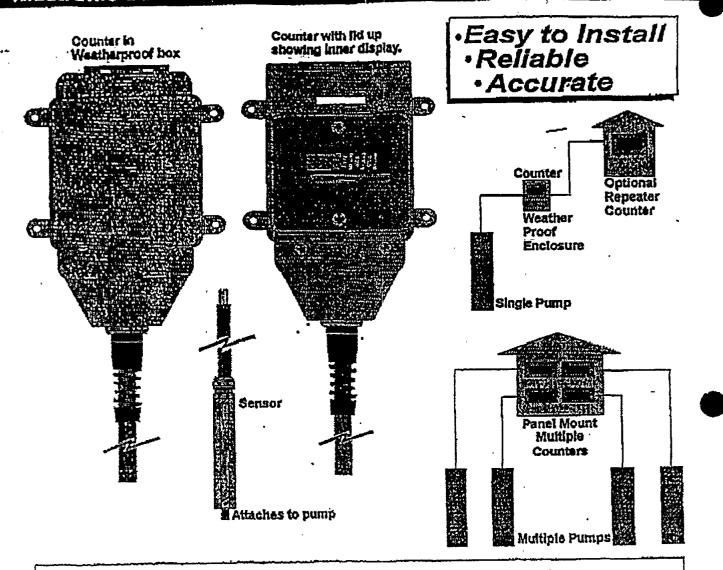
QЯ

B. Adjust air pressure with optional pressure regulator (see Illustration).



10

Electronic Counter With LCD Readout For HammerHead 4" Pumps



- High Contrast, Easily Legible Display. 7-Digit Maximum Display
- ◆ No Power Necessary (Integrated Lithium Battery)
- Resetting Modes -Lockable Button On Front Side- Electrical Remote Reset

SENSOR MATERIAL All Stainless Steel with chemical resistant Kynar coated cable

OPERATING TEMPERATURE (READABILITY) 32°F to 122°F (0°C to 50°C)

MAXIMUM CABLE RUN Length from sensor (top of pump) to counter- 1/4 mile (1,320 ft. / 402 m)

COUNTER, LCD (FOR PANEL MOUNT)
COUNTER, WEATHER PROOF
SENSOR, WITH 50 FT (15 M) DOWN WELL CABLE
SENSOR, WITH 100 FT (30 M) DOWN WELL CABLE
P/N 37247
P/N 37250



P/N 2067 REV.#1 4-12-96

110A Series "APCO" One & Two Stage Turbine Type Pumps

EP-1 Capacities To 150 GPM eads To 700 Feet ergeres To 275° F

AR309316

Engineering Specifications

The contractor shall furnish (and install as shown on the plans) an Apco regenerative turbine type pump model......size.....(Bronze Fitted) (Bronze Ring) (All Iron) (All Bronze). Each pump shall have a capacity of...... G.P.M. when operating at a total head of......feet at the specified temperature, viscosity, specific gravity, and NPSH. The speed of the pump shall not exceed 1750 R.P.M. (Models A35, A4, B4, C4 and D4 can also be operated at 3500 R.P.M.) The pump is to be furnished with (mechanical seals) (packing). The pump shall be of vertically split case design with removable bearing housings and the channel rings shall be replaceable without replacing the bearing housings. The suction and discharge connections shall be cast integral with the casing. The discharge shall be in a vertical position and the pump shall be self-venting. The casing and bearing housings shall be cast of 30,000 pound tensile strength cast iron. The impeller(s) shall be located on the stainless steel shaft between grease lubricated ball bearings. The impeller shall be hydraulically selfcentering and no external adjustment shall be necessary. Each pump shall be tested prior to shipment. The pump shall be mounted on a (steel drip rim) (steel) baseplate and flexibly coupled to a......HP.....phase...... hertz.....voltage...... R.P.M., horizontal (dripproof) (totally enclosed) (explosion proof) motor. The motor shall be sized to prevent overloading at the highest head condition listed in the specifications.

- 1-	MAXIMUM DIFFERENTIAL PRESS	URE - P.S.I	Atta	,
		4		£90.32
	A SEC NO.	-200	3	10020
200 m		*		1101
	BUANNING S	*		2925
	Second Control of the second	75		160
	Popular B			75.5
MP SIZES	AND AND COME OF			
	ESCHARGE NO.	ALCO MARKET	100	
		1200		200 00
	9.	and the	E.	320E
	200 F41-05, E51-51-151 451 - 611	35		220
	Diperment of the co	3		4000V

NOTE: Maximum differential pressure based on allowable shalf deflection for standard shalfs.

MAXIMUM HORSEPOWE	
EASTA, GA, HA WATAA DAT EAST, FAT, GAT, MIT, MA	
(A35, M, BJ, CA504 🕞	2172
M4, P4, R4, D5, E5, F5, G5, H5, I5, D51, E51, F51, G57, H51, L51	0
J5, K5, L5, M5, N5, P5	20
G6) H6, J6, K6, D6T, E6T, E6T, G6T, H6T, J6T, K6T	40

Ponting.	Victorial of Constitution
	Nylor
Brann Covec	Gard from w. ASTM A48
Cotong .	Cost Iron — ASIN A48
Channel Rings	Cost Iron — ASTM A48
Glandi V	Con iron — ASTM A48
··· Impellers	Bronze — ASTM 862
Pading	Graphited Tellon Fiber
Shoft	Stainless Steel — AISI 416

Limitations

_	
Max. hydrostatic test pressure	450 P.S.I.
Max. hydrostatic test pressure except G6-H6-J6-K6	265 P.S.I.
Max. case working pressure	300 P.S.I.
except G6-H6-J6-K6	175 P.S.I.
Max. suction pressure	175 P.S.I.
except two stage 116 SERIES	
with optional 250 lb. suction flange	300 P.S.I.
Max. recommended packing box pressure	100 P.S.I.
Max. recommended mechanical seal chamber pressure	250 P.S.I.
except 114A, 4R, 4RTL	1 <i>5</i> 0 P.S.I.
Box or seal chamber pressure equals - single stage:	
suction pressure plus 60% differential pressure. Two stages	ge: 1 st stage
equals - suction pressure plus 30% differential, 2nd stag	je equals –
suction pressure plus 80% differential.	
Max. temperatures	
*Packing	275° F
Std. mechanical seal	225° F
Hí-temp méchanical seal	27 <i>5</i> ° F
*PackingSuction lift requires lantern ring, 115 and 1	116 Series only
- · · · · · · · · · · · · · · · · · · ·	

NOTE: Aurora Pump reserves the right to make revisions to its products and their specifications, and to this bulletin and related information without notice.

- Your Authorized Local Distributor -

GENERAL SIGNAL PUMP GROUP

A UNIT OF GENERAL SIGNAL

MARKETING & SALES: 800 AIRPORT ROAD - NORTH AURORA, HLINOIS U.S.A. - 60542 PHONE: (708) 859-7000 FAX: (708) 859-7060 TELEX: 720411 AURORA MFG. PLANT: 800 AIRPORT ROAD • NORTH AURORA, ILLINOIS U.S.A. • 60542 HYDROMATIC MFG. PLANT: 1840 BANEY ROAD • ASHLAND, OHIO U.S.A. • 44805 PHONE: (419) 289-3042 FAX: (419) 289-9574

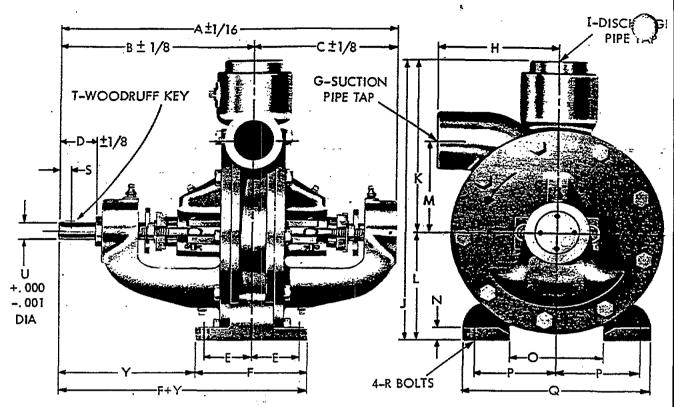


SALES OFFICES IN ALL MAJOR CITIES AND COUNTRIES Refer to "Pumps" in the yellow pages of your phane directory for your local Distributor

AR309317

AURORA TYPE 4R. 4RS. 4RA, 4RAS, SECTION 110 PAGE 2 5R, 5RS, 5RA & 5RAS SERIES

SINGLE STAGE APCO PUMPS RIGHT HAND PUMP ILLUSTRATED DATED JANUARY 19 EP-1



PUMP MODELS	А	В	С	D	E	F	G	H	I	J	К	L
A35,A4,B4,C4,D4,E4, F4,G4,H4,I4,I4A	10-1/2	5-15/16	4-9/16	1	1-23/32	4-1/2	1-1/4	4	1-1/4	9-3/4	6-1/4	3-1/2
M4.P4.R4 ±	14-1/8	ธ-1/8	٠ 6	1-13/16	2-1/8	5-1/4	1-1/2	-1	1-1/2	8-7/8	5-3/8	3-1/2
D5,E5,F5,G5,H5,I5	14-11/16	8-3/5	6-5/16	1-1/2	2	5	1-1/4	5-1/8	1-1/4	12-1/4	7-1/2	4-3/4
J5,K5,L5,M5,N5,P5	16-5/8	9-5/16	7-5/16	2	2-5/8	6-1/4	2	5-1/8	1-1/2	12-1/4	7-1/2	4-3/4

PUMP MODELS	N	0	P	Q	R	S	Т	ט	Y	F+Y
A35,A4,B4,C4,D4,E4, F4,G4,H4,I4,I4A	1/2	3	2-3/4	6-1/2	5/16	3/8	-3	.590	3-11/16	8-3/16
M4.P4.R4	1/2	3	2-3/4	6-1/2	5/16	1/2	* 9	,787	5-1/2	10-3/4
D3.E5.F3.G5.H5.I5	9/16	4	3-1/2	8	3/8	1/2	=G	.787	5-7/8	10-7/8
J5,K5,L5,M5,N5,P5	9/16	4	3-1/2	8	3/8	1/2	#91	.984	6-1/4	12-1/2

NOTES:

All dimensions in inches Dimensions may vary ± 1 3. Not for construction

purposes unless certifie

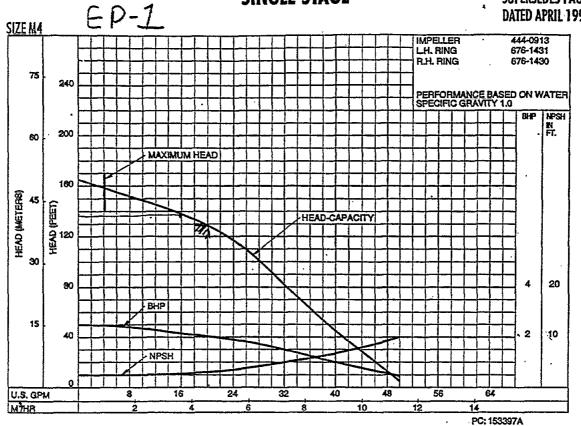


AURORA PUMP

A UNIT OF GENERAL SIGNAL

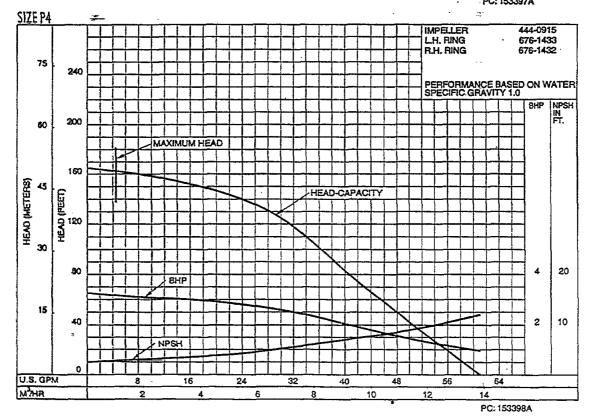
$1^{1}/_{2} \times 1^{1}/_{2} \times 4$ SERIES 110A SINGLE STAGE

DATED NOVEMBER 1993
SUPERSEDES PAGE 409
DATED APRIL 1992



1750 RPM

pump height = 9" length = 14"



1750 RPM

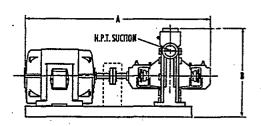
AURORA PUMP SA UNIT OF GENERAL SIGNAL 800 AIRPORT ROAD • NORTH AURORA, KLINOIS 60542

AR309319

Dimensions

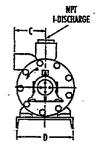
Type 4 & 5 Series

4R, 4RA, 5R, 5RA

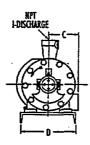


4R, 4RA, 5R, 5RA

-- 数据证据



4RTL, 5RTL

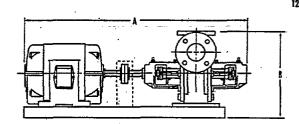


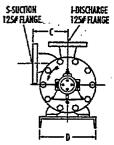
Type 6 Series

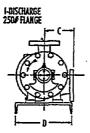
6RA, 6RTL, 6RATL



6RTL, 6RATL







- 1. Dimensions and weights are approximate.
 2. Dimensions are in inches and may vary ±1/8".
 3. Not for construction purposes unless certified.
 4. Frame sizes shown are for open diripproof motors only.
 5. Conduit box is shown in approximate position. Dimensions are not specified as they vary specified as they vary with each motor
- manufacturer.

 6. All floriges are standard flat face.

NOTES:

- NOTES:

 1. Selections indicate pump size in upper portion and motor H.P. in lower portion of each black.

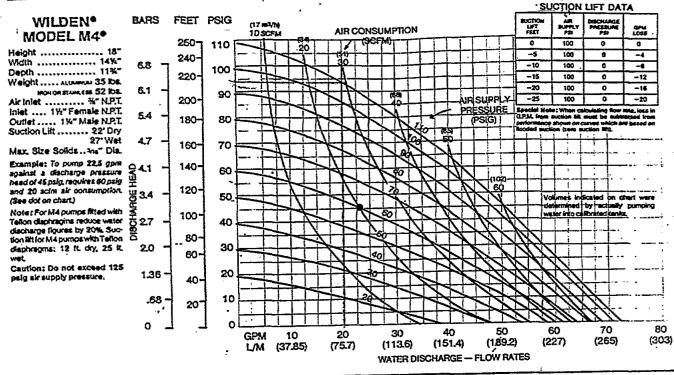
 2. A35, A4, B4, C4 and D4 pumps are also available for 3500 R.P.M. operation. See table on page 4.

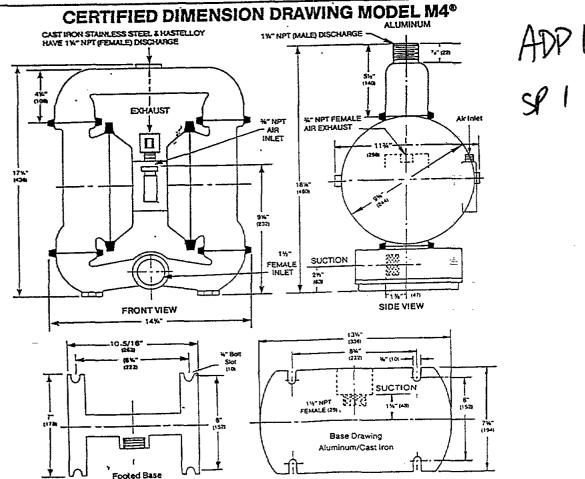
 3. Maximum suction
- 3. Maximum suction
- Maximum suction
 pressure is based on
 suction flange pressure
 rating.

 All limitations are based
 on standard pumps
 constructed of standard
 materials and bandling materials and handling water.

HSING	LE STAC	- 46	246	. 3	7 1 1 1	4				manuscrame					TŴO	STAGE
48	A3	i, A4, B4 4, G4, H	I, C4, D4	; E4	484			P4, 84		NEMA	1750	48TL		AT, EAT,	FAT, G4 LATA	
Unit	Dad				Uoir	Dei			42.	Motor	RPM.	Unit	10.24	数级		. 154 :
Wgt	A	В	C	D	Wgt.	A	8	C	D	Frame	HLP.	Wgt.	A	8	C	٥
1861	224	a127	Æ.	7.5	25	5,27集		44.6	10	3.5	10.52	125	25	4 1112	54 h	9-
66	22	13	4	7	108	25	12	4	9	1431	1_	105	23	12	41/2	9
\$Z.13	223 -	132	黎 在。	7.2	213.	. 26	202章	34. c	60	251			223	2 472;	dia	9
95	24	13	4	9	126	27	12	4	10	1821	3	126	25	13	Alva	10
300	725 ·	332	24	9 7	331	.285	第3毫	4	alog	\$		433	265	3.	44	10
161	27	14	4	10	195	30	14	4	12	2137	71/2	195	28	14	44	12
31815	229	.144	4.	.10 s	215	32%	角发	24:	127	2351	101	215	EGO?	4:	44	12
5R	DS	, E5, F5	G5. H5	. 15	5RA	JS	, K5, L5,	M5. N5	. P.S	NEMA	1750	SRIL			51, F51, 151, 151	
Unit		IN S			Unit		714.0		1.2.35	Motor	R.P.M.	Unit	Disd			L 11/4
Wgt.	A	3	С	Þ	Wgt.	A	8	c	D	Frome	H.P.	Wgt.	A	8	c	D
725	28	15%	₹5×	9.4	P		, C	; 7.	5/5/20	756%	520		1	-	·	
111	26	15	5 ·	10	128	28	15	5	10	143T	1	128	28	15	5	10
416	: 27	15%	₹5	10	133	29	₹15%	√ 5	107	1450	33/2	133	- 29	~1 <i>5</i>	5	10
126	28	15	5	10	143	30	15	5	10	1821	3	143	30	15	5	10
133	29	15/7	.5	10	148	31	45:	. 5	107	1841	₹5	148	31	÷15	5	10
195	31	16	6	12	214	33	16	5	12	2131	71/1	214	33	16	5	12
219	33	16.	5	12	234	35	16	5	12	2151	₹10	234	35	16	5	12
332	26	18	5	13	347	38	18	5	13	2547	15	346	38	18	5	13
357	38	18	5	13	381	40	18	5	13	256T	20:	381	40	18	5	13
6RA		G6, H6	, J6, K6		NEMA	1750	ARTL.		DóT, E	6T. F6T		6RATL	(36T, H61	, 16T, K	ST'
Unit	Disch	25/2	Suc	1.3	Motor	2.P.M.	Unit	Dist	h.2	Suci	21/2	Unit	Disc	: 21/2	50	et. 3
Wgt.	A		¢	0	frome	H.P.	Wgt.	<u> </u>	В	С	D	Wgt.	A	8	<u>_c</u>	٥
245	35	18	61/2	12	182T	3	264	35	17	61/2	12	325	38	17	7	15
249	36	18	6/1	12	184T	5	369	36	17	61/2	12	330	39	17	7	15
341	38	19	61/2	13	213T	742	361	38	18	61/2	13	390	41	17	7	15
361	40	19	61/2	13	215T	10	381	40	18	61/2	13	410	43	17	7	15
436	43	19	61/2	13	254T	15	456	43	18	61/2	13_	490	46	. 17	7	15
475	45	18	61.7	15	256T	20	495	45	17	Q _l /3	15	515	48	17	7	15
545	46	19	61/2	15	284T	25	565	46	18	61/2	15	585	49	18	7	15
575	48	19	61/2	15	2861	30	595	47	18	61/2	15	649	50	19	7	18

A-133

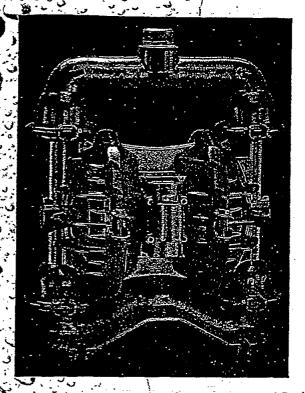




Stainless Steel/Hastelloy NOTE: Suction and discharge nipples on standard aluminum pumps are mild steel and on alloy-fitted aluminum pumps are stainless. NOTE: Nipples are cast in and cannot be removed. All other models have female connections threaded into the casting.

NOTE: Models M4/SG and M4/SN have 2" standard tri-clamp style fittings.

O.D. - 2.516"



SPECIFICATIONS

Materials of Construction, Wetted Housings

(Water Chambers, Inlet/Discharge Manifolds)

SHP. WT. MATERIAL

Aluminum 37 lbs. Hastelloy C 58 lbs.

316 Stainless Steel. ~ Cast Iron

Materials of Construction, Non-Wetted Housings

DESCRIPTION MATERIAL Center Section Polypropylene

Center Block Aluminum or Aluminum, Nickel-Plated

Air Chambers Mild Steel or

Mild Steel, Nickel-Plated

Air Valve Brass or

> Brass, Teflonz-Coated or Brass, Nickel-Plated

Stainless Steel

Suction Lift Capability

DRY LIFT PRIMED LIFT 25' (7.62m) 21' (6.4m)

The above figures represent rubber-fitted pump capabilities. Consult your distributor for TPE and/or Tellon®-fitted pump data.

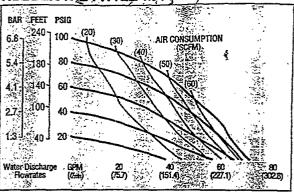
Maximum Diameter Solids

1/4 (4.76mm) Diameter

Elastomer Options

MATERIAL	TEMPERATUR	RE i	LIMITS	
Polyurethane	+10 (-12.2)	ſΟ	+150 (65.6)	F° (C°)
Neaprane	0 (-17.8)	to	+200 (93.3)	Fo (Co)
Buna-N	+10 (-12.2)	to	+180 (82.2)	F° (C°)
Nordel	-60 (-51.1)	to	+280 (137.8)	Fo (Co)
Viton	-40 (-40.0)	10	+350 (176.7)	Fo (Co)
Saniflex ^{r4}	-20 (-28.9)	to	+220 (104.4)	F° (C°)
Tefion*	÷40 (4.4)	to	+220 (104.4)	F° (C°)
14 Wil-Flexix	-40 (-40.0)	to	+225 (107.2)	F° (C°)

RUBBERT PE FIT

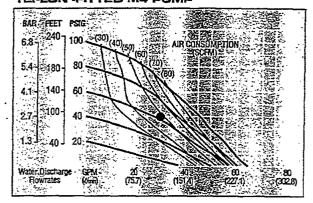


M4 Metal Pump Flows up to 70 G.P.M.

Maximum pump operating pressures should not exceed 125 psig (8.62 Bar).

Volumes indicated on charts were determined by actually pumping water into calibrated tanks.

TEFLON'-FITTED M4 PUMP

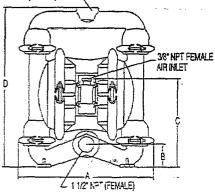


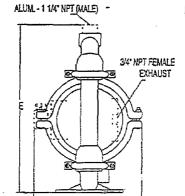
Example:

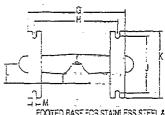
To pump 30 gpm against a discharge head of 40 psig requires 60 psig and 50 scfm air consumption. (See dot on Teflon-fitted chart.)

DIMENSIONAL DRAWING

CAST IRON, STAINLESS STEEL & HASTELLOY 1 1/4" NPT (FEMALE)

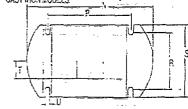






FOOTED BASE FOR STAINLESS STEEL & HASTELLOY MODELS

SCREEN BASE FOR ALUMINEY &



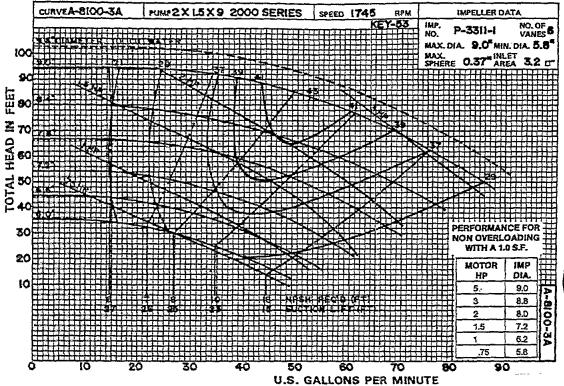
CER	TIFIED DIMENSIONS	- M4 (METAL)							
ITEM	STANDARD (meh)	METRIC (mm)							
A	14 1/4	361.95							
_ B_	2 1/2	63.5C							
C	9 1/4	234,95							
0	15 7/8	428,52							
E	18	457.20							
F	11 1/8	282.57							
G	10 1/4	260.35							
H	8 3/4	222 50							
J	6	152,40							
K	7	177 80							
L	2	50.80							
M	7/15	11.10							
N	13 1/4	335,55							
٥.	8 3/4	222.50							
R	6	152.40							
S	7.5/8.	193,67							
T	1 7/8	7,63							
Ü	1/2	12,70							
BSP thi	BSP threads available								



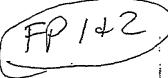
END SUCTION PUMPS 2000 Series, Single-Stage Close-Coupled or Frame Mounted Pumps with Mechanical Seals or Packing — Performance Curves Key 53, 54 — 1750 Rpm

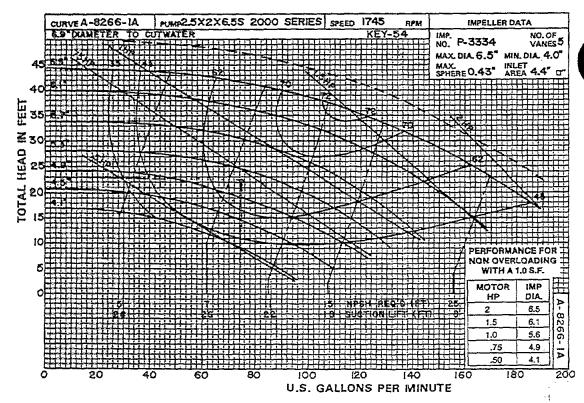




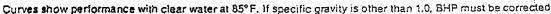




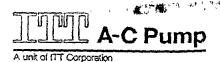








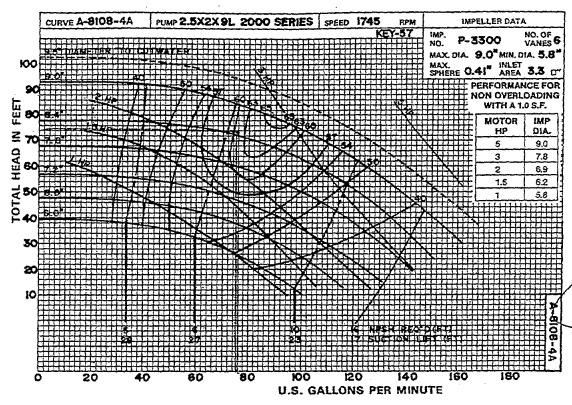
<u> — 14 —</u>



END SUCTION PUMPS

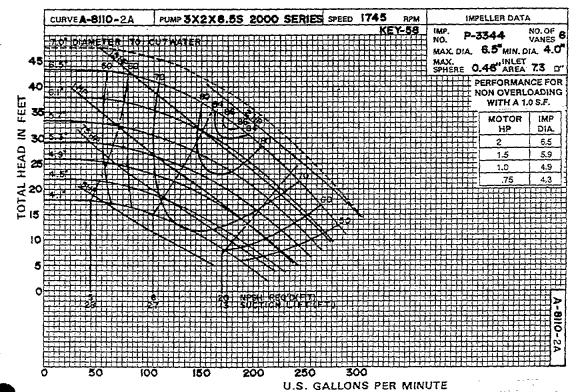
2000 Series, Single-Stage Close-Coupled or Frame Mounted Pumps with Mechanical Seals or Packing — Performance Curves Key 57, 58 — 1750 Rpm







PFP 142





Curves show performance with clear water at 85°F. If specific gravity is other than 1.0, BHP must be corrected



END SUCTION PUMPS 2000 Series, Single-Stage Close-Coupled or Frame Mounted Pumps with Mechanical Seals or Packing — Performance Curves Key 55, 56 — 1750 Rpm

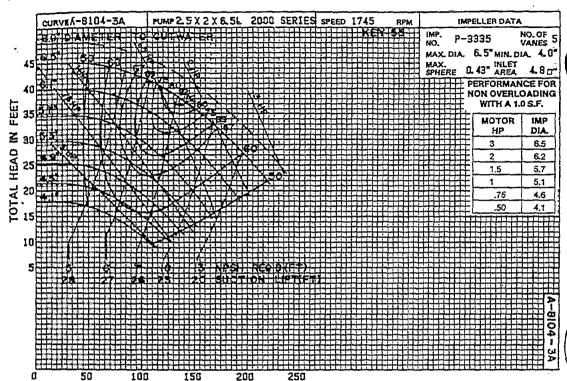


CP 1.1

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June 1984

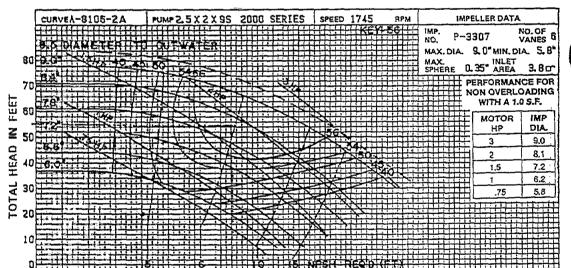
Supersedes all previous issues





SELECTION and CURVES

PPINZ



U.S. GALLONS PER MINUTE



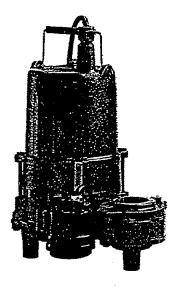
Curves show performance with clear water at 85°F. If specific gravity is other than 1.0, BHP must be corrected

AR309325

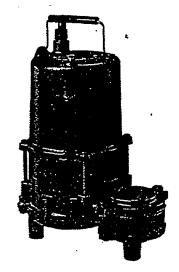
A-138

A-8106-2A

100 120 140 U.S. GALLONS PER MINUTE

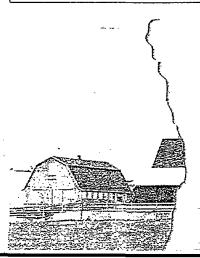


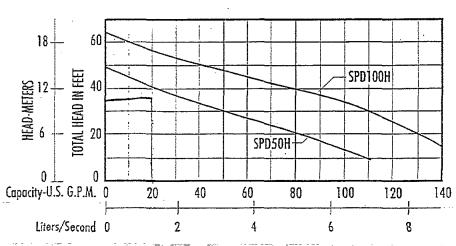
11



	SPD50H
Typical Application*	Effluent and Dewatering
Copacities	to 112 GPM (7.1 1/s)
Heads	to 50 ft (15.2 m)
Electrical	115V, 1s, 14FLA, 60Hz; 230V, 1s, 7.0FLA, 60Hz
	200V, 3ø, 3.6FLA, 60Hz; 230V, 3ø, 3.5FLA, 60Hz
	460V, 3ø, 1.8FLA, 60Hz; 575V, 3ø, 1.6FLA, 60Hz
Motor	(single phase) - 1/2HP Split phase w/solid state
	switch, start capacitor and thermal overload
	protection, 3450 RPM; (three phase) - 1/2HP
	polyphase, 3450 RPM
Minimum Recommended	Simplex = 24" (609.6mm)
Sump Diameter	Duplex = 36" (914.4mm)
Automatic Operation	Diaphragm pressure switch (single phase only)
	(manual available)
Moterials of construction	Class 30 cast iron
lmpeller .	Closs 30 cast iron, two vane non-clog
Discharge Size	2" (50.8mm); 3" (76.2mm) optional
Solids handling	3/4" (19.1 mm)
Power cord	l ø (without seal failure probe) -
	10', SJTW, STW-A(20' optional);
	ls (with seal failure probe) & 3s - 20', STW-A
Superior Features	 Two (2) carbon/ceramic type 21
	mechanical seals mounted in tandem
	 Oil filled motor w/automatic reset thermal
	overload for maximum protection
	 Upper & lower ball bearing construction
	 Piggy-back plug available for easy
	maintenance and replacement (automatic models only)
	 Seal failure probe warns of seal leak (optional)
	Capacitor start for increased starting torque

Typical Application*	Effluent and Dewatering
Copadiies	
Heads	
Electrical	230V, 1s, 9.7FLA, 60Hz; 200V, 3s, 5.5FLA, 60Hz
	230V, 3g, 4.0FLA, 60Hz;
	460V, 3ø, 2.5FLA, 60Hz, 575V, 3ø, 2.5FLA, 60Hz
Motor	(single phase) - THP Split phase w/solid state switch, start
	capacitor and thermal overload protection, 3450 RPM;
•	(three phase) - THP polyphase, 3450 RPM
Minimum Recommended	Simplex = 24" (609.6mm)
Sump Diameter	Duplex = 36" (914.4mm)
Automatic Operation	Wide-angle float switch (single phase only)
	(manual available)
Materials of construction	Cless 30 cost iron
Impeller	Class 30 cast iron, two vane non-clog
Discharge Size	2" (50.8mm); 3" (76.2mm) optional
Salids handling	
Power cord	Le (without seal failure probe) – 20° ,STW-A;
	lø (with seal failure probe) & 3ø - 20', STW-A
Superior Features	 Two (2) carbon/ceramic type 21 mechanical seals
	mounted in tandem
	 Oil filled motor w/automatic reset thermal overload for
	maximum protection
	Upper & lower ball bearing construction
	 Piggy-back plug available for easy maintenance and
	replacement (automatic models only)
	 Seal failure probe warns of seal leak (optional)
	 Capacitor start for increased starting tarque







A-139

• HYDROMATIC™ Wholesaler Pumps and Accessories

• Effluent Pumps

Sewage Pumps

Accessories

Sump Pumps

G GENERAL SIGNAL PU

AR309327

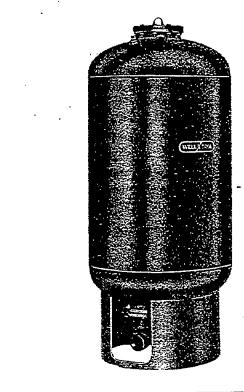
AMTROL

WELL-X-TROL®

SERIES 400 and 450

Pre-pressurized Hydropneumatic Tanks (CODE AND NON-CODE)

Applications, selection and sizing procedures







MARK OF THE ORIGINATOR

WELL-X-TROL QUICK SIZING FORM

CALCULATING ESP VOLUME	r
Pump delivery (average for pressure range)	20 GPM
Desired running time, in minutes and	
fractions of minutes (1.5 min. = 1 min. 30 sec.)	<u>2</u> Min.
Multiple Line 1 by Line Condenses ESD Volume	## Will.
3. Multiply Line 1 by Line 2 and enter ESP Volume	
	Gallons
CALCULATING TANK SIZE	' <u> </u>
4. Minimum system pressure (pump cut in)	Psig Psig
Maximum system pressure (pump cut out)	
Refer to Table 1. Find Acceptance	
factor for Line 4 and Line 5 and enter	0. 3 <i>0</i> 9 Acc. Factor
7. Divide Line 3 by Line 6 and enter	
minimum total WELL-X-TROL volume	/29Gals.
8. Refer to Table 2 and select WELL-X-TROL	- 1
model that is at least equal to Line 7	•
for "Total Volume" and Line 6 for	
Acceptance Factor	<u>√57</u> wx no.
- 4	

Z" System Connect, Dimensions: Ht. 724" Dia. 30"

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95	0.684	0.635	0.593	0.54/	0.501	0.456	0.410	0.365	0.319	0.273	0.228	0.182	0.137	0.031	U.U45	_					ļ					
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125	0.752	0.716	0 680	0.644	0 606	0.573	0.537	0 501	0 465	0 459	0.394	0.358	0.322	0.286	0.250	0.215	0.179	0.143	0.107	0.071	0.035	_	İ			1
130	0.760	0.726	0.591	0.657	0 622	0.586	0.553	0.519	0.484	0 450	0.415	0.381	0.346	0.312	0.277	0.243	0.208	0.173	0.138	0.104	0.069	0.034)		}
135	0.768	0.735	0,701	0.668	0.635	0.601	0.563	0.534	0.501	0.468	0.439	0.401	0.367	0.334	0.301	0.267	0.234	0.200	0.167	0.134	0.100	0.066	0 033	—		- 1
140																						0 096				1
145	0 783	0 751	0 720	0.689	0.658	0 626	0 595	0.564	0 532	0 501	0 470	0.438	0 407	0.376	0 344	0.313	0.282	0.250	0.219	0.188	0.156	0.125	0 093	0 062	0 031	- 1
[ł			}														1	1				1
153	0 789	0.759	0.729	0 699	0.668	0.638	0 606	0 577	0.547	0 517	0 486	0.456	0 426	0.396	0.365	0.335	0.305	0.273	0.243	0.213	0.182	0.151	0 121	0 091	0.060	0 030
	<u> </u>	L	<u> </u>	<u> </u>	· · ·	i		<u> </u>	<u> </u>	! <u>'</u>	<u> </u>	لـــــا			·		<u> </u>	<u> </u>		<u> </u>	1	i	Ь	L		

EXAMPLE 1

A new manufacturing plant supplies its various processes with well water, pump switch settings are from 90 to 120 psig with appropriate pressure reduction at machines. Average pump delivery in this operating range is 75 gpm using a 15 HP submersible motor with a recommended 1½ minute running time.

ESP VOLUME

75 gpm
1½m
= 113 gallons
-
90 psig
120 psig
0.223

0.223 8. WELL-X-TROL selection

WX-457

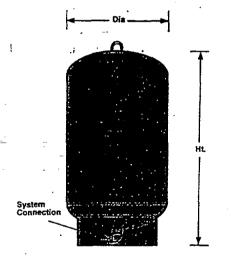
= 506 gallons

EXAMPLE 2

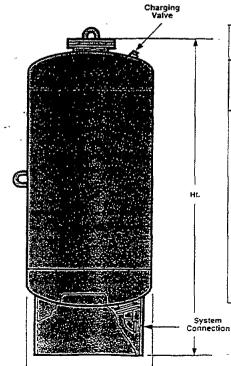
The well of an adjacent plant became low yield, water was now available at 2 gpm. Storage was required. Rather than redrilt the well, WELL-X-TROLs are to be installed to provide 10 gallons every 15 minutes at a pressure of 120 to 150 psig. In this case, the ESP volume is given 10 gallons.

	9
ESP Volume	10 gallons
CALCULATING TANK SIZE	•
Minimum System Pressure	120 psi
Maximum System Pressure	150 psi
Acceptance Factor (table 1)	0.182
Minimum WELL-X-TROL Volur	ne 55 gallons
8. WELL-X-TROL selection	WX-404

NOTE: Actual water stored will be 66 gallons (volume of the WX-404) x 0.182 = 12 gallons.



		4008	RIES			
A PLANE BY A CONT. IN CONT. THE	VELLX-TROL VOL GALS	ACCEPT.		HES)	SYSTEM CONN.	SHIP WT. LBS.
WX-401	17.5	.646	26¾	161⁄4	1" FPT_	95
WX-402	25	.452	35	161/4	1" FPT	112
WX-403	34	.332	45¾	161/4	1" FPT	123
WX-404	66	.515	441/4	24	11/4 " FPT	210
WX-405	88	.386	561/2	24	1¼ " FPT	280

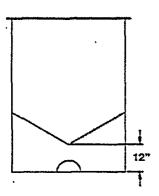


100 mg 10	t seek to the seek		450 SERIES		Same ang Lan Same ang Lan Albana L	indicate of the
	VELL-X-TROL VOL. GALS.		DIMEN (INC HT.		SYSTEM	SHIP WT.
WX-451	158	VCE	721/4	30	2" FPT	626
WX-452	211	ACCEPTANCE	901/4	30	2" FPT	760
WX-453	264	CCE	841/2	36	3″ FPT	810
WX-454	317	ONA	97	36	3" FPT	914
WX-455	370	LIMIT	1091/4	36	3" FPT	1018
WX-456	422	NOL	801/2	48	3" FPT	1655
WX-457	528		93½	48	3" FPT	1925

All

30° Cone Bottom with Skirt

30° Cone Bottom w/skirt, Open Top



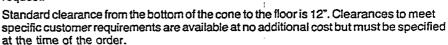
Open top skirted tanks include a flanged lip for tank stability and one scallop for plumbing access to the bottom of the tank. Standard clearance from the bottom of the cone to the floor is 12".

- For bolt-down covers see page A15.
- · For accessories see pages D1-14.
- · For resin selection see pages E1-4.
- · For warranty information see page E5.

Open Top Part No.	Nominal Capacity (gal.)	Diameter x Height (In.)	Approx. Wall Thickness (in.)	Approx. Weight (lbs.)
C34-250	250	48 x 55	7/32	178
C34-450	450	48 x 81	7/32	227
C34-650	650	48 x 107	7/32	272
C35-450 C35-650 C35-850 C35-1050 C35-1250	450 650 850 €1050 1250	60×62 60×79 60×96 60×113 60×130	7/32 7/32 7/32 7/32 7/32	372 421 419 453
C35-1250	1450	60 x 147	7/32	488
C35-1450	1450	60 x 147	7/32	522
C36-650	650	72 x 64	7/32	430
C36-850	850	72 x 76	7/32	458
C36-1050	1050	72×88	7/32	487
C36-1250	1250	72×100	7/32	516
C36-1450	1450	72×112	7/32	545
C36-1650	1650	72×124	7/32-1/4	584
C36-1850	1850	72×136	7/32-1/4	620
C36-2050	2050	72×148	7/32-1/4	656
C36-2250	2250	72×160	7/32-1/4	693

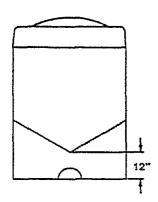
CONSTRUCTION NOTES:

30° Cone bottom skirted tanks are supported by an extension of the sidewall and feature one 5" radius scallop for plumbing access. Larger scallops are available upon request.



Tanks are supplied in natural resin color. Specific color options are available at additional cost.

30° Cone Bottom w/skirt, Annular Domed Top



Annular dome top skirted tanks are totally enclosed for a dust free environment. Standard clearance from bottom of the cone to the floor is 12".

- Enclosed tanks must be vented. See page D5 for venting information.
- · For accessories see pages D1-14.
- · For resin selection see pages E1-4.
- For warranty information see page E5.

Annular	Nominal	Diameter	Approx. Wall	Approx.
Domed Top	Capacity	x Height	Thickness	Weight
Part No.	(gal.)	(in.)	(in.)	(lbs.)
C34-25C	250	48 x 58	7/32	175
C34-45C	450	48 x 84	7/32	240
C34-65C	650	48 x 110	7/32	265
C35-45C	450	60 x 66	7/32	408
C35-65C	650	60 x 83	7/32	457
C35-85C	850	60 x 100	7/32	466
C35-105C	1050	60 x 117	7/32	500
C35-125C	1250	60 x 134	7/32	534
C35-145C	1450	60 x 151	7/32	569
C36-65C	650	72×70	7/32	497
C36-85C	850	72 x 82	7/32	524
C36-105C	1050	72×94	7/32	<i>5</i> 55
C36-125C	1250	72 x 106	7/32	584
C36-145C	1450	72 x 118	7/32	613
C36-165C	1650	72 x 130	7/32-1/4	652
C36-185C	1850	72 x 142	7/32-1/4	688
C36-205C	2050	72 x 154	7/32-1/4	724
C36-225C	2250	72 x 166	7/32-1/4	761

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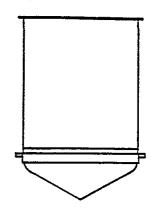
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A-144

30° Cone Bottom with Leg Ring

		-				
Open Top Part No.	Nominal Capacity (gals.)	Diameter xHeight (in.)	Approx. Wall Thick. (in.)	Approx. Weight (lbs.)	Pipe Size (in.)	Leg Length for "0" Clearance
C34-250L C34-450L	250 450	48 x 44 48 x 70	5/32 5/32	182 215	2 2	19 19
C34-650L	650	48×96	7/32	281	2	19
C35-450L C35-650L	450 650	60 x 51 60 x 68	7/32 7/32	366 401	3 3	26 26
C35-850L C35-1050L	850 1050	60 x 85 60 x 102	7/32 7/32	435 477	3 3	26 26
C35-1250L	1250	60 x 119	7/32	503	3	26
C35-1450L C36-650L	1450 650	60 x 136 72 x 55	7/32	538		26 28½
C36-850L	850	72×55 72×67	7/32	450 479	3 3	281/2
C36-1050L C36-1250L	1050 1250	72×79 72×91	7/32 7/32	508 537	3 3 3	28½ 28½
C36-1450L	1450	72 x 103	7/32	566	3	28½ 28½
C36-1650L C36-1850L	1650 1850	72 x 115 72 x 127	7/32 7/32	595 624	3 3	281/2
C36-2050L	2050	72 x 139	7/32	653	3	28½ 28½
C36-2250L	2250	72 x 151	7/32	682	3	281/2
C37-1500L C37-2000L	1500 2000	90 x 74 90 x 92	3/16 3/16	865 925	4 4	32 32
C37-2500L	2500	90 x 111	3/16-1/4	1017	4	32
C37-3000L C37-3500L	3000 3500	90 x 129 90 x 148	3/16-1/4 3/16-1/4	1079 1213	4 4	32 32
C37-4000L	4000	90 x 146	3/16-1/4	1338	4	32 32

30° Cone Bottom w/leg ring, Open Top

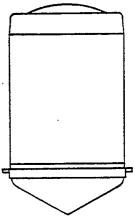


Open top leg ring tanks include a flanged lip and FRP encapsulated steel leg ring. Legs are not included and must be ordered separately. See page A14 for information.

- · For bolt down covers see page A15.
- For accessories see pages D1-D14.
- · For resin selection see pages E1-4.
- · For warranty information see page E5.
- Tanks are supplied in natural resin color. Specific color options are available at additional cost.

Annular	Nominal	Diameter	Approx.	Approx.	Pipe	Leg Length
Domed Top	Capacity	x Height	Wall Thick.	Weight	Size	for "0"
Part No.	(gals.)	(in.)	(in.)	(lbs.)	(in.)	Clearance
C34-25CL	250	48 x 47	5/32	187	2 2 2	19
C34-45CL	450	48 x 73	5/32	215		19
C34-65CL	650	48 x 99	7/32	272		19
C35-45CL	450	60 x 55	7/32	426	3 3 3 3 3	26
C35-65CL	650	60 x 72	7/32	458		26
C35-85CL	850	60 x 89	7/32	489		26
C35-105CL	1050	60 x 106	7/32	521		26
C35-125CL	1250	60 x 123	7/32	560		26
C35-145CL C36-65CL C36-85CL	1450 650 850	60 x 140 72 x 61 72 x 73	7/32 7/32 7/32	592 534 558	3	26 26 28½ 28½ 28½
C36-105CL C36-125CL C36-145CL C36-165CL	1050 1250 1450 1650	72×85 72×97 72×109 72×121	7/32 7/32 7/32 7/32	587 614 640 667	3 3 3 3 3 3	28½ 28½ 28½ 28½ 28½
C36-185CL C36-205CL C36-225CL	1850 2050 2250	72×133 72×145 72×157	7/32 7/32 7/32	694 721 748	3 3	28½ 28½ 28½ 28½
C37-150CL C37-200CL C37-250CL C37-300CL	1500 2000 2500 3000	90 x 81 90 x 99 90 x 118 90 x 136	3/16 3/16 3/16-1/4 3/16-1/4	1022 1072 1154 1236	4 4 4	32 32 32 32
C37-350CL	3500	90 x 155	3/16-1/4	1336	4	32
C37-400CL	4000	90 x 173	3/16-5/16	1432		32

30° Cone Bottom w/leg ring, Annular Domed Top



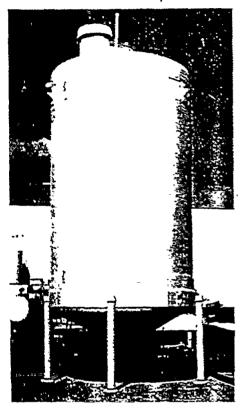
Annular dome top leg ring tanks are totally enclosed and are supported by a FRP encapsulated steel leg ring. Legs are not included and must be ordered separately. See page A14 for information.

- Enclosed tanks must be vented. See page D5 for venting guidelines.
- For accessories see pages D1-D14.
- · For resin selection see pages E1-4.
- · For warranty information see page E5.



one Botton

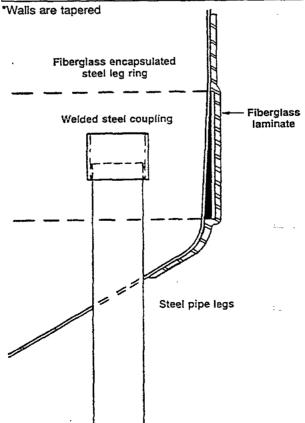
Chop-hoop Filament Wound 30° Cone Bottom Fiberglass Tanks

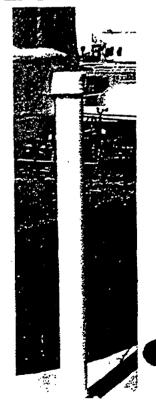


- 30° cone bottom tanks are supported by steel pipe legs threaded into a fiberglass encapsulated steel legring. Legs must be ordered separately. (See page B6 for detail.)
- 8' diameter open top tanks include an external flanged lip. 10'4" diameter tanks include an Internal flange lip. (See page B6 for detail.).
- · Closed top tanks are designed for atmospheric pressure only and must be vented. (Refer to venting specifications on D5.)
- Standard tank is designed for 1.3 specific gravity material. 1.8 and 2.1 versions are available upon request.
- · For accessories refer to pages D1-14.
- · For resin selection see pages E1-E4.
- · For warranty information see page E5. Seismic Zone design requires special consideration. Contact Plastics Engineering for full assistance.

Open Top Part No.	Nominal Capacity (gal.)	Dia.xHeight (in.)	Wall* Thick. (in.)	Approx. Weight (lbs.)	No. of Legs
C38-2MO	2000	8' x 7'1"	1/4	1280	4
C38-3MO	3000	8' x 9'9"	1/4	1430	4
C38-4MO	4000	8' x 12'5"	1/4	1570	4
C310-4MO	4000	10'4" x 8'6"	1/4	2230	6
C38-5MO	5000	8' x 15'1"	1/4-5/16	1710	4
C310-5MO	5000	10'4" x 10'1"	1/4	2340	6
C38-6MO	6000	8' x 17'9"	1/4-5/16	1950	4
C310-6MO	.6000	10'4" x 11'8"	1/4-5/16	2450	6
C310-7MO	70,7000	10'4" x 13'3"	1/4-5/16	2560	6
C310-8MO	8000	10'4" x 14'10"	1/4-5/16	2720	8
C310-9MO	9000	10'4" x 16'5"	1/4-5/16	2860	8
C310-10MO	10000	10'4" x 18'0"	1/4-5/16	3010	8

Closed Top Part No.	Nominal Capacity (gal.)	Dia.xHeight (in.)	Waii* Thick. (in.)	Approx. Weight (lbs.)	No. of Legs
C38-2MC	2000	8' x 7'8"	1/4	1340	4
C38-3MC	3000	8' x 10'4"	1/4	1480	4
C38-4MC	4000	8' x 13'0"	1/4	1620	4
C310-4MC	4000	10'4" x 9'0"	1/4	2350	6
C38-5MC	5000	8' x 15'8"	1/4-5/16	1760	4
C310-5MC	5000	10'4" x 10'7"	1/4	2460	6 4
C38-6MC	6000	8' x 18'4"	1/4-5/16	1980	4
C310-6MC	6000	10'4" x 12'2"	1/4	2570	- 6
C310-7MC	7000	10'4" x 13'9"	1/4	2680	6
C310-8MC	8000	10'4" x 15'4"	1/4-5/16	2830	8
C310-9MC	9000	10'4" x 16'11"	1/4-5/16	2970	8
C310-10MC	10000	10'4" x 18'6"	1/4-5/16	3120	8





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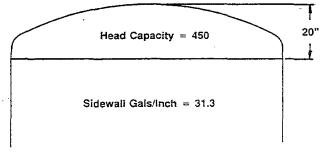
Flat Bottom Domed To



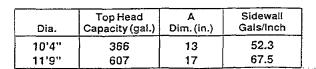
Classed Ton	Nominal	Diameter	Approx. Wali*	Approx.
Closed Top	Capacity	x Height	Thickness	Weight
	(gal.)	(in.)	(in.)	(lbs.)
F082DT	2000	8' x 6'4"	1/4	840
F083DT	3000	8'x9'	1/4	980
F084DT	· 4000	8'x11'8"	1/4	1140
F104DT	4000 、	10'4' x 7'1"	1/4-9/32	1075
F085DT	5000	8' x 14'3"	1/4-9/32	1280
F105DT	5000	10'4" x 8'8"	1/4-9/32	1206
F086DT	6000	8'x16'11"	1/4-9/32	1520
F106DT	6000	10'4" x 10'3"	1/4-11/32	1336
F126DT	6000	11'9" x8'1"	1/4-5/16	1375
F087DT	7000	8' x 19'7"	1/4-9/32	1710
F107DT .	7000	10'4" x 11'10"	³ 1/4-11/32	1480
F127DT	7000	11'9" x9'4"	1/4-5/16	1500
F088DT	8000	8' x 22'3"	1/4-11/32	1900
F108DT	8000	10'4" x 13'5"	1/4-11/32.	1647
F128DT	8000	11'9" x 10'7"	1/4-5/16	1625
F109DT	9000	10'4" x 15'	1/4-11/32	1813
F129DT	9000	11'9" x 11'10"	1/4-5/16	1768
F1010DT	10000	· 10'4" x 16'7"	1/4-7/16	1988
F1210DT	10000	11'9" x 13'1"	1/4-5/16	1910
F1012DT	12000	10'4" x 19'10"	1/4-7/16	2390
F1212DT	12000	11'9"x15'6"	1/4-3/8	2215
F1014DT	14000	10'4" x 23'	1/4-1/2	2820 .
F1214DT	14000	11'9" x 18'	1/4-7/16	2565
F1015DT	15000	10'4" x 24'7"	1/4-1/2	3100
F1215DT	15000	11'9" x 19'2"	1/4-7/16	2750
F1216DT	16000	11'9" x 20'5"	1/4-7/16	2935
F1218DT	18000	11'9" x 22'11"	1/4-1/2	3350
F1220DT	20000	11'9" x 25'5"	1/4-1/2	3580
F1221DT	21000	11'9" x 26'8"	1/4-1/2	3800
F1222DT	22000	11'9" x 27'11"	1/4-19/32	4410
F1225DT	25000	11'9" x 31'7"	1/4-5/8	5550
F1230DT	30000	11'9" x 37'9"	1/4-23/32	6950
*146-17				

^{*}Walls are tapered

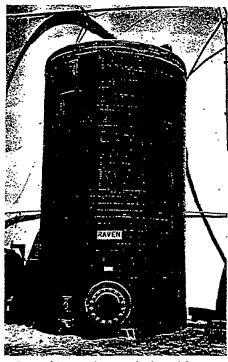
8' Diameter - Domed Top



10'4" and 11'9" Diameter - Annular Domed Top



Chop-hoop Filament Wound Flat Bottom Domed Top Fiberglass Tanks



- Domed top tanks are designed for atmospheric pressure only and must be vented. Refer to venting specifications on page D5.
- Standard tank is designed for 1.3 specific gravity material. 1.8 and 2.1 versions are available upon request.
- · All filament wound tanks include three lift lugs.
- For accessories refer to pages D1-14.
- For resin selection see pages E1-E4.
- For warranty information see page E5.

Día.	Bottom Head Capacity (gal.)	B Dim. (in.)
8'	240	8
10'4"	366	7
11'9"	607	9

8 **Bottom Head**

NOTE: Tank bottom must be fully supported and pad must remain level within 1/8" over a ten foot span. Consult a local engineer for specific site requirements.

AR30933 RAVEN INDUSTRIES, INC. Plastics Division Sioux Falls, SD RA'VE Nº





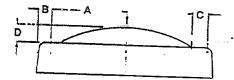
Centrifugally Cast Flat Bottom, Domed Top Fiberglass Tanks

Flat Bottom-Dome Top Tanks are totally enclosed and are designed for chemical and water storage applications requiring a dust free environment.



- Annular head configuration allows for easy fitting installation.
- Standard resin tanks, through 72" diameter are supplied with aqua sidewall and white ends. 90" diameter tanks and all premium resin tanks are natural in color.
- · For resin selection see pages E1-4.
- For accessories see pages D1-14.
- · For warranty information see page E5.

NOTE: Enclosed tanks are designed for atmospheric pressure only and must be vented! For venting specification refer to page D5.



ANNULAR HEAD **DIMENSIONS**

		Dim. (inc	ines)	
Tank Dia.	A	В	С	D
24	71/8	47/4	5	1
30	101/4	47/2	5	11/2
32	11	5	5	2
38	14	5	5	3
12	16	5	5	3
8	19	5	5	4
60	243/4	51/4	41/2	6
72	30	6	6	71/4
90	40	5	5	83/4

					-1,507_115,00
·	Nomina				
1	Capacit			Approx. W	all Approx
Part No.	(gai.)	y x Height (in.)		Thickness	S Weight
D2242	60	24 x 36		(in.)	(lbs.)
D2502	110	24 x 36 24 x 61		1/8	32
D2812	160	24×88		1/8	47
D3162	70	30 x 28		1/8	61
D3333	120	30 x 45		1/8 5/32	40
D3533 D3643	170	30 x 63		5/32	55
D3043	200	30 x 75		5/32	72 85
D4133	75	32 x 26		5/32	41
D4423	125 175	32×41	i	5/32	59
D4583	225	32×55 32×70		5/32	72
D4733	275	32 x 84	- 1	5/32	81
D4813	290	32 x 89	ı	5/32	102
D5183	145	38 x 34		5/32 5/32	106
D5293 D5393	195	38 x 44		5/32 5/32	71
D5393 D5493	245	38 x 55	i	5/32	85 98
D5603	295 345	38 x 65	.	5/32	111
D5703	395	38 x 76		5/32	127
D5803	425	. 38 x 86 38 x 92	- 1	5/32	143
D6243	205	42 x 39		5/32	149
D6333	255	42×49		5/32	98
D6413	305	42 x 55	- 1	5/32 5/32	110
D6503 D6593	355	42×64		5/32 5/32	121 132
D6683	405 455	42×72	.	5/32	143
D6803	505	42×81		5/32	155
D7213	275	42×90	_	5/32	168
D7273	325	48 x 41 48 x 47		5/32	134
D7343	375	48 x 55	-	5/32 5/32	146
D7413 D7473	425	48×61		5/32 5/32	158 172
D7613	475	48 x 67	ì	5/32	188
D7784	575 675	48 x 80		5/32	207
D7914	775	48 x 93 48 x 106	- 1	7/32	238
D7A44	875	48×119		7/32 7/32	250
D7C44	1025	48 x 139	-	7/32	272 306
D8434 D8554	690	60×67	_	7/32	331
D8674	830 970	60×79		7/32	356
D8834	1115	60 x 91		7/32	380
D8954	1250	60 x 103 60 x 115	.	7/32	405
D8B94	1540	60 x 139	1	7/32 7/32	429
D8C94	1660	60 x 146		7/32	478 499
DF354 DF654	1000	72 x 66	1	7/32	488
DF994	1500 2000	72×96		7/32	560
DFD24	2500	72 x 124		7/32	641
DFG84	3000	72 x 153 72 x 182		7/32	720
D9224	1000	90 x 47	+	7/32	806
D9414	1500	90 x 66		3/16 3/16	557
D9594 D9725	2000	90 x 84	1	3/16	613 693
D9725 D9925	2500	90 x 103	3	/16-1/4	763
D9A56	3000 3500	90 x 121	3.	/16-1/4	853
D9C96	4000	90 x 140 90 x 158		/16-5/16	947
D9C18	4500	90 x 177		16-5/16	1071
D9E58	5000	90 x 196		/16-3/8 /16-3/8	1183 1339
D9G88 D9J18	5500	90×214		16-3/8	1489
23010	6000	90 x 233		16-3/8	1596
				·····	

AR309335

CONVERSATION RECORD

TIME: 1000

DATE: 16 May 1996

NAME OF PERSON(S) CONTACTED: John Pease

ORGANIZATION: Raven Industries

TELEPHONE NO:

SUBJECT: 1000 gallon fiberglass storage tank & compatibility with chlorinated solvents & BTEX

sludge containment.

SUMMARY:

John indicated that their resin #470 would have some organic resistance to phase out liquids from the sludge over a short period of time provided that the liquids would be skimmed or pumped off the sludge. The phase out liquids would cause problems with some of their resins.

He indicated that a teflon tank or a stainless steel tank would be more suitable for this applications with high concentrations of solvents.

The 1000 gallon conical bottom fiberglass tank would costs approx. \$5000 w/o fittings. He is sending me a catelog cut and a chemical compatibility publication .

NAME OF PERSON DOCUMENTING CONVERSTION

Lidal

Nancy Pridal

SIGNATURE

DATE: /6 May 1996....



MEMO

January 15, 1996

To: Engineering and Sales Staff

From: John A. Peasley.

Subject: Wastewater Design Concerns

Several chemicals which may be found in process or washdown waste water are very active organic solvents that would at some concentration be insoluble. If the organic solvents phase out, they would form a layer of nearly pure solvent. That layer would be damaging to the vinyl ester resin system normally specified for this application. In fact, they would attack most of the resin systems available to the reinforced plastics industry.

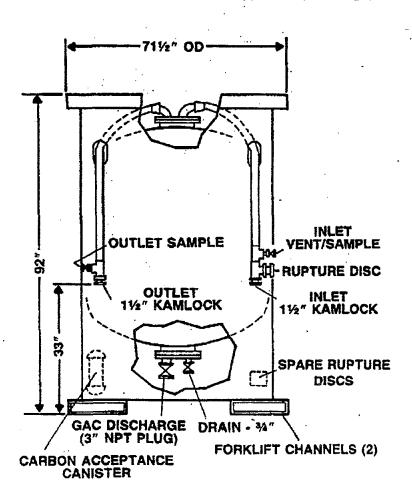
The service life of a tank in an organic solvent application is directly related to the field operating conditions. The potential for forming an organic solvent layer would be minimized if the vessel was stirred and completely drained on a regular schedule. A regular inspection of the inside surface would be a good way to prevent unexpected tank failure.

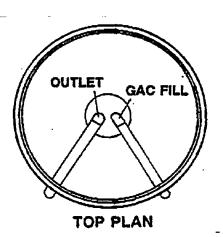
An additional question should be, "Is the process or washdown waste water highly alkaline?". Any comments or questions, please contact me.

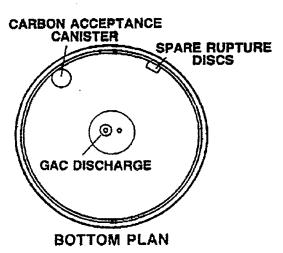
Post-It* Fax Note Date 4 /2C 7671 pages 7 JANFILE MAYIS Kransa Co./Dept. Corron Phone # Fax # 402 221 -384/2

DATA SHEET **CYCLESORB FP2**

Liquid







63

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DESCRIPTION

The Cyclesorb FP2 is a corrosion resistant, pressure rated transportable adsorber, designed to contain 2000 pounds of granular activated carbon (GAC) and treat flows up to 60 gpm.

SPECIFICATIONS

Adsorber Vessel:

The Cyclesorb FP2 adeorber is constructed of fiberglass reinforced plastic with an internal lining of high density polyethylene (HDPE). The vessel is rated to 150 psig at 150°F in accordance with NSF-44. The maximum allowable working conditions are 75 psig at 140°F and no vacuum. The vessel has a 63 inch nominal OD, and has a 600 gallon capacity. The water is collected by a polypropylene nozzle.

Piping and Accessories:

The Cyclesorb FP2 piping consists of Schedule 80 polypropylene piping and viton hose. Piping is threaded, and hoses have polypropylene Kamlok Connections. GAC Discharge is equipped with a polypropylene ball valve, with a threaded union connection and a 3 inch threaded (plugged) outlet. The GAC FIH is accessed by removing the influent hose at the top of the adsorber. Connections at the system are polypropylene connections as follows:

Influent	11/2 inch Kamlok
Effluent	13% inch Kamiok
GAC Discharge ,	3 inch NPT
GAC Fix	2 inch Kamlok

The influent and effluent lines are equipped with ½ inch ball valves for sample and/or vent. The adsorber is equipped with a 75 psig graphite rupture disk: on the influent line. Gaskets, as required, are EPA rubber.

Wetted Parts Summary-Process Flow:

Wetted parts are polyethylene, polypropylene, viton (hose) EPR rubber (gaskets) PVC (sample valves/drain valve) and graphite (rupture disk).

Frame:

The Cyclesorb FP2 frame is designed to contain and protect the adsorber and piping during operation and transport. The frame is constructed of metal and is $69^{\circ} \times 69^{\circ} \times 92^{\circ}$ high. The frame is equipped with fork channels, and may be moved via forklift or lifted using 2 eyelets at the top of the frame.

Granular Activated Carbon:

The Cyclesorb FP2 can be provided with 2000 pounds of selected grades of liquid phase granular activated carbons, including both virgin or reactivated grades.

Weights:

Empty	1,750 lb
With dry GAC	3,750 lb
With wet, drained GAC	5,750 lb
Operating	8 100 lb

Miscellaneous:

- Cyclesorb FP2 is provided with spare rupture disks and container located on frame.
- 2. Cyclesorb FP2 may be provided with carbon acceptance canister for accelerated collection of spent carbon sample.

PERFORMANCE

Pressure drop performance is based upon "general" granular activated carbon in mesh size ranges from 8x30 to 12x40.

APPROX. FLOW (GPM)	APPROX. PRESSURE DROP (psig)
20	4.5
40	9.1
60	14.0

NOTE: Above performance based upon average GAC packed bed and clean water; actual conditions may vary.

SERVICES

Cyclesorb FP2 may be provided on a service basis, whereby Calgon Carbon retains ownership of units and is responsible for exchange services. Calgon Carbon also offers carbon exchange services for purchased Cyclesorb FP2 units. Contact a Technical Sales Representative for more information.

Calgon Carbon Corporation practices a policy of continuous product improvement. It reserves the right to alter designs and specifications without prior notice.







INSTALLATION AND OPERATION INSTRUCTIONS



Calgon Carbon's Cyclesorb FP Series Adsorbers are individual, compact, transportable liquid phase adsorbers. Cyclesorb FP Adsorbers were developed for convenient installation and operation, with capability for return to Calgon Carbon for reactivation of the spent granular activated carbon (GAC) and refill with fresh GAC. Calgon Carbon offers many types of GAC which can be selected for the specific treatment application.

Cyclesorb FP Adsorbers are Fiberglass pressure vessels with a polyethylene liner, with piping and accessories of industrial thermoplastics for corrosion resistance. The Cyclesorb FP adsorbers are available in the following standard units:

- Cyclesorb FP1; 1000 lb. GAC, 30 gpm flow capacity
- Cyclesorb FP2; 2000 lb. GAC, 60 gpm flow capacity

The specific Cyclesorb FP Product Bulletin and Drawing Specification Sheet is considered to be part of these instructions and should be referred to when necessary.

SHIPMENT

Cyclesorb FP Adsorbers are shipped as a single adsorber, with an integral frame, without crating or containers. The Cyclesorbs are provided with fork channels for movement with fork trucks, or can be lifted and moved with a crane. The Cyclesorbs are shipped filled with the specified amount of dry GAC.

Shipping weights are as follows:

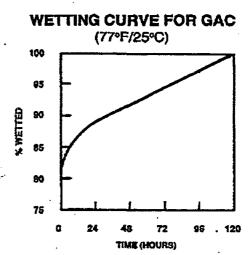
- Cyclesorb FP1: 2,320 lb
- Cyclesorb FP2: 3,750 lb

WETTING AND DEAERATION

As the Cyclesorb FP is shipped with dry GAC, the carbon must, be wetted and deaerated prior to use. This procedure displaces air from the internal structure of the carbon granule, thus assuring that the liquid to be treated is in contact with the carbon surface.

Prior to operation, the adsorber must be filled with clean, uncontaminated liquid. With the vent valve open, the liquid is introduced through the outlet line, and the unit is filled until the liquid flows out the vent. The Cyclesorb should be allowed to set for a minimum of 24 hours, but preferably for 72 hours, to allow most of the carbon internal surface to be wetted. The wetting curve indicates how much of the internal surface becomes wetted over time.

After wetting, the carbon bed can be deaerated by draining the adsorber, and again filling the adsorber upflow with uncontaminated water. This procedure will eliminate any air pockets which may have formed between the carbon granules. The Cyclesorb is now ready for operation.



INSTALLATION

The Cyclesorbs should be set on a flat surface, capable of supporting the operating weight of the Cyclesorb. Operating weights of the units are as follows:

- · Cyclesorb FP1: 4,780 lb
- Cyclesorb FP2: 8,100 lb

The inlet and outlet piping should be connected to the unit using flexible hoses with 1½ Inch Kamlok type female hose connections. The outlet piping should be designed to allow flooded operation of the Cyclesorb at all times to assure effective operation. If the outlet line does not provide for backpressure on the Cyclesorb unit, then the discharge piping should include an elevated piping loop to assure flooded operation.

Cyclesorbs can be manifolded in parallel operation for higher flowrates. For series operation, two Cyclesorbs can be connected sequentially, as normal pressure drop will not exceed the recommended operating pressure.

A filter should be installed prior to the Cyclesorb If the liquid to be treated contains substantial amounts of suspended solids. A simple carridge or screen filter helps prevent pressure buildup in the GAC bed.

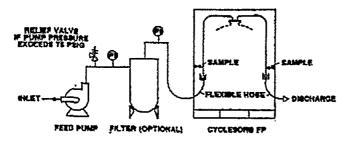
OPERATION

With the Cyclesorb full of liquid, flow can be introduced to the unit. Liquid enters through the inlet connection, flows downflow through the carbon bed and exits through the outlet connection.

Flowrates to the Cyclesorb should be determined based upon the required contact time between the figured and the carbon media. The required contact time normally is determined prior to installation and operation of the Cyclesorb.

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CALGON CARRON CORPORATION + P.O. BOX 717 • PITTSBURGH, PA 15230-0717 • PHONE 1-800-4CARBON



TYPICAL CYCLESORB FP INSTALLATION

if suspended solids do accumulate on the top of the GAC bed, the Cyclesorb can be backflushed to remove solids and resume operation. Clean, uncontaminated liquid should be introduced to the unit through the cutlet connection. This liquid flows upflowthrough the unit and should exit through the vent line - directed to a backflush water collection point or drain. The flow rate should not be high enough to cause carbon granules to exit. Typical backflush rate is 75 ppm.

Cyclesorbs are provided with rupture disks to assure that the operating pressure is not exceeded. If the rupture disks burst, do not continue to operate by blinding the rupture disk line, investigate the cause of the high pressure and remedy. Spare rupture disks are provided in the spare rupture disk holder on the unit. Replace the rupture disks before continuing operation and contact Calgon Carbon for replacement of spare disks.

For short term shirtdowns, simply isolate the Cyclesorb unit by shutting inlet and outlet lines and open vent line. For extended shutdowns, also drain the Cyclesorb of interstitial liquid.

MONITORING

Cyclesorb units only require periodic monitoring if properly installed. The following items may be monitored:

- Pressure: Check inlet and outlet pressure. Increase in pressure differential may indicate build-up of filtered solids.
- Samples: inlet and outlet sample points are provided for liquid analysis to determine system performance.
- Air: Checkfortrapped airby isolating Cyclesorb (shutinlet and outlet) and opening inlet sample tap or vent.

SPENT CARBON ACCEPTANCE

Prior to return of either Cycles orb or the spent GAC to Calgon Carbon, the spent GAC must undergo acceptance testing. The Cycles orb is provided with a carbon acceptance canister, inlet liquid should be introduced to the carbon acceptance canister, and allowed to flow for enough time to allow the carbon to adsorb sufficient amounts of contaminants for acceptance testing. The acceptance canister should then be drained, sealed and shipped to Calgon Carbon in accordance with instructions to allow for testing.

CYCLESORB RETURN

No Cyclesorbs can be returned to Calgon Carbon for Refill Service or spent carbon reactivation unless the carbon acceptance procedure has been completed, and an acceptance number provided.

Prior to return shipment, the Cyclesorb is disconnected from the inlet and outlet lines, and all liquid is drained from the adsorber using bottom %* drain connection. Do not open the GAC discharge valve to drain liquid from the unit.

After draining, hose caps must be placed on all hose connectors. The Calgon Carbon Small Systems Coordinator should be notified when the Cyclesorb is ready to ship. The Cyclesorb shipment must be accompanied with the site name and the carbon acceptance number provided by Calgon Carbon.

SPENT CARBON DISCHARGE

The Cyclesorb may have the spent GAC removed at the site rather than returned to Calgon Carbon. For spent carbon discharge, the unit is first disconnected from the inlet and outlet, as it would be for shipment. The unit is lifted onto plers or other support to connect the GAC discharge to a receiving container using flexible hose.

The unit is pressurized to 15 psig by using a water connection to the influent hose connection point. When pressurized, the bottom GAC discharge valve is opened (remove plug) and the carbon-liquid slurry is transferred from the Cyclesorb to the receiving container. When the transfer is complete (liquid only in hose), the Cyclesorb may be refilled with liquid and the transfer repeated to assure more complete removal of spent carbon.

Aftertransfer of spent carbon is complete, it is recommended that the inside of the Cyclesorb be washed to remove all contamination and any trace of spent carbon. After system is washed, the Cyclesorb should also be checked thoroughly and any minor maintenance conducted.

FRESH CARBON FILL

Fresh carbon is filled using dry GAC. The Cyclesorb should be approximately 1/3 filled with clean liquid to provide for a cushion to protect the collection nozzle. The 2" inlet hose connection on the top flange is opened, and the GAC filled directly into the Cyclesorb (a funnel is recommended).

When the fill is complete, the Inlet hose is reconnected and the start-up procedure is followed including wetting and deaeration.

SAFETY CONSIDERATIONS

Wet or dry activated carbon preferentially removes oxygen from air. In closed or partially closed containers, oxygen depletion may reach hazardous levels. If workers must enter a container containing carbon, appropriate sampling and work procedures should be followed for potentially low-oxygen spaces - including all applicable federal and state requirements.

Cyclesorb FP Adsorbers are FRP pressure vessels with a polyethylene liner; do not strike the outside of the vessel or expose the vessel to vacuum, either of which may damage the inner liner.

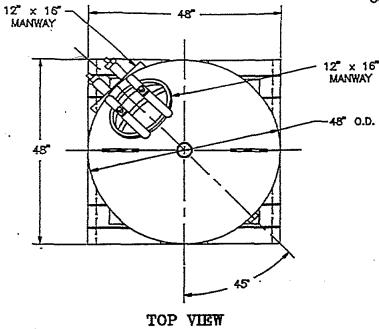


LIQUID GAC

8640 Monticello Lane Maple Grove, MN 55369-4547 612-425-2992 800-526-4999 Fax 612-425-6882

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	LPC 3	LPC 3.85	LPC 3.110	PC1	PC 3	PC 5	PC7	PC 13	PC 20	PC 28	PC 50	PC 78
VESSEL	1.8 ft.	2.16 ft.	2.5 ft.	1.2 ft.	1.8 ft.	2.5 ft.	3.0 ft.	4.0 ft.	5.0 ft.	6 ft.	8 ft.	10 ft.
DIAMETER	(0.55 m)	(0.66 m)	(0.76 m)	(0.37 m)	(0.55 m)	(0.76 m)	(0.91 m)	(1.22 m)	(1.52 m)	(1.83 m)	(2.44 m)	(3.05 m)
OVERALL	2.8 ft.	5.02 ft.	3.4 ft.	3.9 ft.	4.5 ft.	7.5 ft.	7.3 ft.	7.5 ft.	7.5 ft.	15 ft.	17 ft.	18.5 ft.
HEIGHT	(0.85 m)	(0.92 m)	(1.04 m)	(1.19 m)	(1.37 m)	(2.23 m)	(2.23 m)	(2.29 m)	(2.29 m)	(4.57 m)	(5.19 m)	(5,64 m)
BED AREA	2.6 ft ³	3.68 R ²	4.9 ft²	1.1 ft²	2.4 R³	4.9 ft²	7 ft²	12,6 ft²	19.6 ft ³	28 ft ¹	50 ft ³	78.5 N²
	(0.24 m²)	(0.54 m²)	(0.46 m²)	(0.10 m2)	(0.22 m²)	(0,46 m²)	(0.65 m²)	(1.2 m³)	(1.82 m²) ·	(2.6 m²)	(4.7 in ³)	(7.3 m²)
FLOW	1-10 gpm	1-13 gpm	1-17 gpm	0.5-10 gpm	1-20 gpm	3-35 gpm	4-70 gpm	6-90 gpm	10-138 gpm	14-201 gpm	25-360 gpm	40-550 gpm
RANGE	(4-38 L/min)	(4-49 L/min)	(4-64 L/min)	(2-38 L/min)	(4-76 L/min)	(11-132 L/min)	(15-265 L/min)	(23-340 L/min)	(38-522 L/min)	(53-761 L/min)	(95-1363 L/min)	(150-2082 L/min)
CARBON	150 lbs.	250 lbs.	350 lbs.	90 lbs,	250 lbs.	575 lbs.	900 lbs.	1,500 lbs.	2,500 lbs.	5,000 lbs.	10,000 lbs.	20,000 lbs.
	(68 kg)	(114 kg)	(159 kg)	(41 kg)	(114 kg)	(261 kg)	(409 kg)	(681 kg)	(1,135 kg)	(2,270 kg)	(4,540 kg)	(9,080 kg)
PITTINGS	Two Ly" influent/ effluent connections	Two 19" influent/ effluent connections	Iwo 2" influent effluent connections	Two 1" influent/ effluent connections	Two I" influent/ effluent connections	Two 2" influent/ effluent full couplings, one 12" x 16" and one 6" x 8" access port One 3" air pressure relief coupling	Two 2" influent/ effluent full couplings, one 12" x 16" and one 6" x 8" access port pressure pressure rellef coupling	Two 2" influent/ edfluent full couplings, two 12" x 16" secess ports pressure relief coupling on 3" carbon slurry flange	Two 3" influent/ effluent/ dieffluent/ dieffluent/ diefluent/	Two 4" influent effluent effluent fanges, four 12" x 16" secas ports, one 4" carbon slury flange	Two 4" influent/ effluent finges, four 12" x 16" scess ports, one 4" carbon slurry flange	Two 6" influent/ effuent langes, four 12" x 16" access ports, one 4" carbon alurry flange
DESIGN PRESSURE	1% psi (0.2 bar)	1% psi (0.2 bar)	14 psi (0.2 bar)	150 psi (10 bar)	150 psi (10 bar)	100 psi (6.9 bar)	91 psi (6.3 bar)	91 psi, optional ASME inspected and stamped (6.3 bar)	70 psl, optional ASME inspected and etemped (4.8 bsr)	70 pal, optional ASME inspected and stamped (4.8 bar)	66 pai, optional ASME inspected and stamped (4.6 bar)	80 psi, optional ASME inspected and stamped (5.5 bnr)
EMPTY	50 lbs.	100 lbs.	120 lbs.	23 lbs.	53 lbs.	1,200 lbs.	1,400 lbs.	1,510 lbs.	2,100 lbs.	4,000 lbs.	8,100 lbs.	10,900 lbs.
WEIGHT	(23 kg)	(45 kg)	(55 kg)	(10 kg)	(24 kg)	(545 kg)	(635 kg)	(686 kg)	(953 kg)	(1,816 kg)	(5,677 kg)	(4,949 kg)
LOADED	205 lbs.	350 lbs.	470 lbs.	130 lbs,	320 lbs.	1,775 lbs.	2,300 lbs.	3,010 lbs.	4,600 lbs.	9,000 lbs.	18,100 lbs.	30,000 lba.
	(93 kg)	(159 kg)	(213 kg)	(59 kg)	(145 kg)	(806 kg)	(1,044 kg)	(1,367 kg)	(2,088 kg)	(4,086 kg)	(8,217 kg)	(13,620 kg)
OPERATING 423 lbs.	G 423 lbs.	725 lbs.	970 lbs.	290 lbs.	775 lbs.	2,830 lbs.	3,730 lbs.	5,750 lbs.	9,476 lbs.	24,000 lbs.	36,500 lbs.	67,900 lbs.
WEIGHT (192 kg)	(192 kg)	(329 kg)	(440 kg)	(152 kg)	(352 kg)	(1285 kg)	(1,693 kg)	(2,610 kg)	(4,302 kg)	(10,896 kg)	(16,571 kg)	(30,827 kg)
SPENT & DRAINED WEIGHT	355 lbs. (161 kg)	600 lbs. (272 kg)	820 lbs. (372 kg)	215 lbs. (98 kg)	560 lbs. (254 kg)	2,350 lbs. (1067 kg)	3,200 lbs. (1,453 kg)	4,510 lbs. (2,048 kg)	7,100 lbs. (3,223 kg)	14,000 lbs. (6,356 kg)	28,100 lbs. (12,557 kg)	50,900 lbs. (23,109 kg)

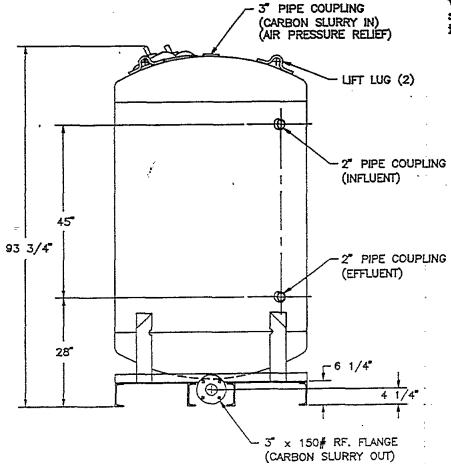
Carbon Adsorber-Liquid Phase PC 13 / 100



Notes:

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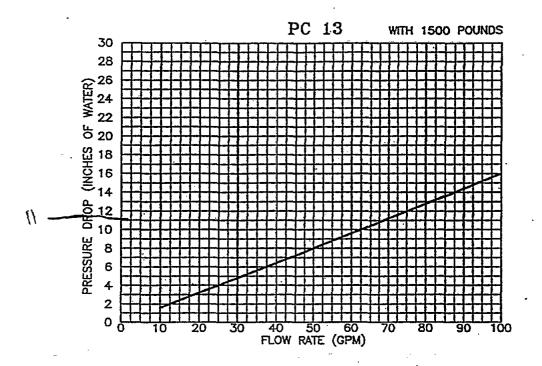
- 1. Pressure vessel manufactured to ASME standards with a pressure rating of 91 PSIG working pressure. Code stamp not included unless required.
- Standard piping and valve packages are shown on piping drawings.

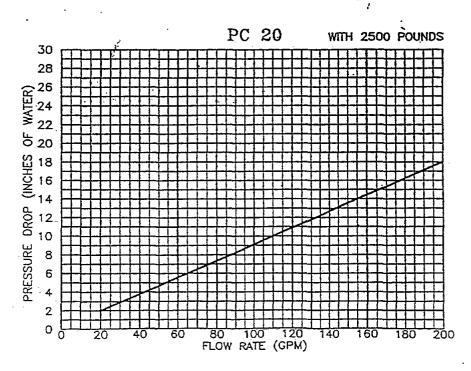


ELEVATION / FRONT VIEW

Sales Drawing #106520 92.12.28 © CARBONAIR 1992

PRESSURE DROP THROUGH CARBONAIR LIQUID-PHASE CARBON UNITS Based on: CECA GAC 30 Carbon Temperature: 55°F

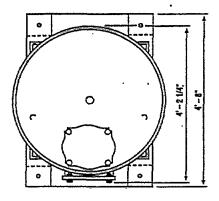


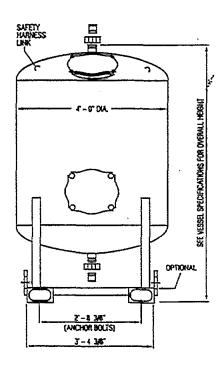


Sales Drawing #117218(03) 95.01.23 © CARBONAIR 1995

There's an AQUA-SCRUB*PV answer for every water treatment problem.

Available in three sizes, all Aqua-Scrub PV vessels have a side manway that permits access to the underdrain system without entering the tank. A Schedule 40 carbon steel adaptor offers easy pipe fit-up and a variety of piping options.





All information presented herein is believed reliable and in accordance with accorded engineering practice. Westales makes no warranties as no completeness of information. Users are responsible for evaluating individual product seasobility for specific applications. Vestales: assumes no liability inharsoever for any special, indirect or consequential surrages arising from the safe, resafe or misuse of its products.

Vessel Specifications	PV-35	PV-50	PV-80	
Overall Height (approx.)	7'1"	8′1″	9'1"	
Inlet Connection, Top	2" 3	2"	3"	
Outlet Connection, Battorn	2"	2"	3*	
Manway, Top & Lower Side	11"×15"	11"×15"	11"×15"	
Internal Piping	PVC	PVC	PVC	
Interior Coating	Fusion-bonded epoxy			
Exterior: Undercoating	Epoxy primer/pretrealment			
Topcoating		Safety blue urethane		
Carbon Fill Volume	36ft³.	54ft ³	72ft³	
Vessel Weight (lbs):	į		•	
Empty	1005	1115	1170	
With KG-401 carbon	2005 ·	2615	3170	
Operating (approx.)	5100	6200	7300	

Operating Specifications

Flow, gpm (nominal)	35	50	80
Pressure, psig (maximum)*	50	50	50
Temperature *F. (maximum)	150	150	150
Pounds of KG-401 Activated Carbon	1000	1500	2000

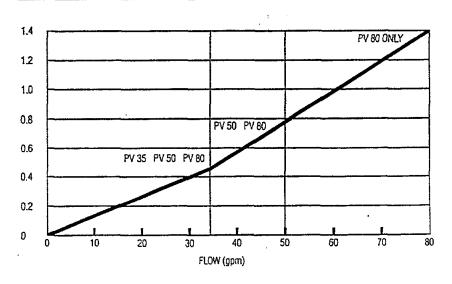
The PV Series is not ASME code stamped. Pressure rating applies to liquid only. For information on the HP Series of code-stamped adsorbers, contact Westates Carbon.

Activated Carbon Specifications²

Westates Carbon Model No.	KG-401	KG-501	CC-601
Mesh Size (U.S. Sieve)	8×30	12×40	12×30
Type (Granular)	Bit. Coal	Bit. Coal	Coconut
lodine No. (Min.)	800	1000	1100

²For assistance in selecting the proper carbon for your application, contact Westates Carbon.

Pressure Drop (PSIG)





WESTATES CARBON, INC.

A Wheelabrator Technologies Company

2130 Leo Avenue. Los Angeles, California 90040, 213 722-7500 Fax 213 722-8207

AR309345





Calgon Carbon's Vapor Pac Service meets industrial needs for cost-effective removal of volatile organic compounds (VOCs) at air emission sources.

The Vapor Pac Service features a small, easily transportable adsorber which contains 1,800 pounds of activated carbon. The adsorber can handle air flows up to 1,000 cfm.

Designed to remove both toxic and non-toxic VOCs, the adsorption system is especially useful for short-term projects and for treatment of low volume flows that contain low to moderate VOC concentrations. Common applications include VOC removal from process vents, soil remediation vents, and air stripper off-gases.

To accommodate a wide variety of process conditions, Vapor Pac adsorbers are available in two basic designs: a polyethylene model that offers excellent corrosion-resistance, and a stainless steel model than can withstand higher temperatures, and slight pressure or vacuum conditions.

Calgon Carbon provides the adsorber, carbon, spent carbon handling and carbon reactivation (after the carbon meets the company's acceptance criteria) as part of the Vapor Pac Service. Ductwork and fans are the only equipment requiring a capital expenditure by the user.

When carbon becomes saturated with VOCs, the system is replaced with another adsorber containing fresh carbon.

By utilizing this unique service, users can generally achieve VOC removal and regulatory compliance objectives, minimize operating costs, and eliminate maintenance costs* (as the equipment is owned and maintained by Calgon Carbon). Furthermore, because organic compounds are safely destroyed through the carbon reactivation process, costs and regulations typically associated with waste disposal can be eliminated.

Please contact a Calgon Carbon Technical Sales Representative to learn more about the advantages of the Vapor Pac Service for your specific VOC control needs.

*Damage to Vapor Pac Unit caused by negligence or misapplication is the responsibility of the user.

FEATURES AND BENEFITS OF VAPOR PAC SERVICE

- Adsorbers are specifically designed for ease of Installation and operation.
- Adsorbers are available in plastic (polyethylene) and metal (stainless steel) construction to accommodate a wide variety of applications.
- System can be operated in series or parallel mode or a combination of both modes to handle a variety of flows and concentrations.
- System exchange eliminates on-site carbon handling.
- Recycling of spent carbon eliminates disposal problems.
- Capital expenditure is eliminated since Calgon Carbon Corporation owns and maintains equipment.

VAPOR PAC (PLASTIC) SPECIFICATIONS

Vessel dimensions:	44 ¹ /4" × 44 ¹ /4" × 89 ² /4 ¹
inlet & discharge connections:	6' PS 15-69 duct flanges
Carbon volume:	60 cu. ft. (1800 lbs)
System shipping weight:	New - 2200 lbs Spent - 4000 lbs
Temperature rating:	150°F max
Static pressure rating above carbon level:	20° W.C. max
Vacuum pressure rating above carbon level:	2" W.C. max

All units shipped F.O.B., Pittsburgh, Pennsylvania

MATERIALS OF CONSTRUCTION

Vessel:	Polyethylene
Frame: ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Carbon steel coated with Sherwin Williams Tile Clad II
Inlet flanges, elbow, septum:	PVC
Discharge flange:	Polyethylene
Fasteners & bottom valve suppor	t plate:Steef, plated
Sample fittings & sample caniste	PVC

VAPOR PAC (STAINLESS STEEL) SPECIFICATIONS

Vessel dimensions, diameter: helght:	5′ 7′3°
Inlet & discharge connections:	
Carbon volume:	60 cu. ft. approx. (1800 lbs)
System shipping weight:	New - 2840 lbs
	Spent - 4640 lbs
Static pressure rating above carbon level:	15 psig
Vacuum pressure rating above carbon level:	Full

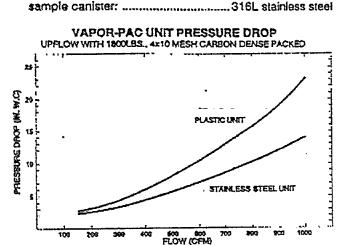
All units shipped F.O.B., Pittsburgh, Pennsylvania

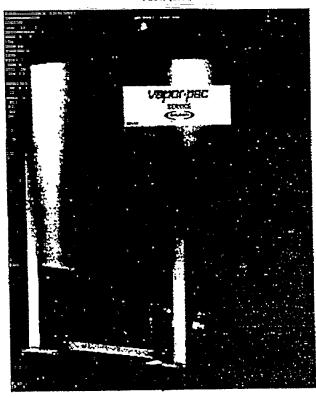
27-1734-08/83

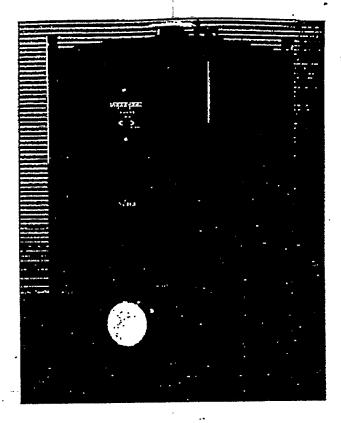
MATERIALS OF CONSTRUCTION

Vescol	316L stainless steel
Skid and support frame:	304 stainless steel
Inlet flanges, elbow, septum:	316L stainless steel
Discharge flange:	316L stainless steel
Fasteners & bottom valve	
support plate:	Steel, plated
Sample fittings &	•

12:08







CAUTION

Wet activated carbon preferentially removes oxygen from air. In closed or partially closed containers and vessels, oxygen depletion may reach hazardous levels. If workers are to enter a vessel containing activated carbon, appropriate sampling and work procedures should be followed, including all applicable federal and state requirements.

For information regarding human and environmental exposure, call Calgon Carbon's Regulatory and Trade Affairs personnel at (412) 787-6700.

INSTALLATION INSTRUCTIONS

See Bulletin #27-199 for details on how to install a Vapor-Pac.

SAFETY CONSIDERATIONS

See Safety Bulletin #27-198 for important safety considerations.

OPTIONAL EQUIPMENT

inlet and outlet flange connectors for ANSI hose connections.

For additional information, contact Calgon Carbon Corporation, Box 717, Pittsburgh, PA 15230-0717, Phone (414) 787-6700







VAPOR-PAC SERVICE UNIT INSTALLATION INSTRUCTIONS

GENERAL DESCRIPTION

Vapor-Pac Service Units are designed to remove volatile organic compounds from various vapor streams using granular activated carbon adsorption. Bach unit contains 1800 lbs of vapor phase granular activated carbon and is capable of handling flows up to 1000 cfm. Vapor-Pacs may be operated in a series or parallel mode.

INSTALLATION INSTRUCTIONS

The Vapor-Pac service unit is shipped ready to install. Examine it to ensure that damages have not occurred in shipment and that all hardware is tight.

Prior to connecting the unit, the bin should be placed on a level accessible area as near as possible to the emission source. If the unit is to be anchored, it is suggested that suitable material (6" channel, 56" in length minimum) be used. This can be either inserted through the fork channel or laid across the base frame. These can then be bolted to the floor.

PLASTIC UNIT

Remove the flange protection covers by hand - DO NOT CUT. Loosen the top discharge lid by twisting to one side, then lift out. Inspect the carbon top surface because in transit the carbon bed may have shifted. Level the top surface, if needed, then reinsert the lid and twist it to lock it in place.

The unit is supplied with six-inch PS 15-69 flanges, both inlet and outlet, as standard connections.

METAL UNIT

The unit is supplied with both inlet and outlet eight-inch PS 15-69 flanges.

All that is needed for connection to a system is flanged ductwork or flexible ventilating hose. All ductwork to the unit should be self-supporting, eliminating stress on the flanges. Exhaust ducting can be vented directly to the atmosphere with suitable rain shield protection or tied into an existing stack. Optional adapter flanges are available for both systems.

Before starting the unit on-line, ensure that the following specifications are not exceeded:

Temperature rated Static pressure rated above carbon level

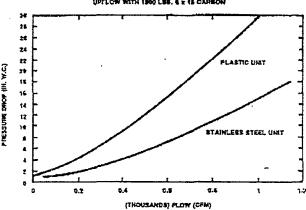
Vacuum pressure rated above carbon level

PLASTIC METAL 150°F max 20" max 15" max

Full

2" max

VAPOR-PAC UNIT PRESSURE DROP UPTLOW WITH 1900 LBB. 6 ± 18 CARBON



- If the inlet is equipped with a sample canister, follow the installation instructions provided with the device.
- After it has been determined that the carbon is spent, disconnect the ductwork and remove the unit from the on-line position. Reinstall the flange protector covers.
- · Return shipping instructions should be obtained through your Calgon Carbon sales representative.

SAFETY CONSIDERATIONS

See Safety Bulletin #27-198 for important safety considerations.

For additional information contact Calgon Carbon Corporation, P.O. Box 717, Piusburgh, PA 15230-0717. Phone Number 412-787-6700.



Bulletin #27-199a

TOTAL P.07

AR309348

June 30, 1995

Scope of Equipment for Soll Oil Project

Model	Units	Description	Price
		E-ZTray Air Stripper System	
EZ-8.4		Biotrol E-Z Tray Air Stripper 230VT 5 hp 3PH EXP 500 CFM. Includes one pieceshell with integral sump, multiple part interior & exterior epoxy coating SS trays, SS Mesh Demister, liquid level site gauge, low pressure gauge. One length and the back can be placed flush against a wall and in a corner.	10,275.00
HILVL LOWAD TEMP DISCH T9050E	1 1 1 1	High Water Level Alarm Low Air Pressure Alarm Temp gauge Discharge pump controls Discharge Pump 50gpm 50 TDH 1 HP 3ph EXP TOTAL	95.00 145.00 39.00 180.00 670.00 11,588.00
SKID	1	Skid including mounting of air stripper transfer pumps and plumbing	525.00 \$ 16,700
Model	Units	Description	Price
		E-ZTray Air Stripper System	-
EZ-12.4	1	Biotrol E-Z Tray Air Stripper 230VT 5 hp 3PH EXP 600 CFM. Includes one pieceshell with integral sump, multiple part interior & exterior epoxy coating SS trays, SS Mesh Demister, liquid level site gauge, low pressure gauge. One length and the back can be placed flush against a wall and in a corner.	e 12,440.00
HILVL LOWAP TEMP DISCH T9050E	1 1 1 1	High Water Level Alarm Low Air Pressure Alarm Temp gauge Discharge pump controls Discharge Pump 50gpm 50 TDH 1 HP 3ph EXP TOTAL	95.00 145.00 39.00 180.00 670.00 13,569.00
		!	

Model Units

Description

Price

System Control Panel

Below you will find the cost for the controls of the equipment that we have quoted above. The Panel will be will be UL approved and certified. The Panel includes a red indicator light for every sensor unlike others manufactures. All sensor not indicated as EXP will have Intrinsically Safe Barriers (IS).

Standard Air stripper control panel with controls for one transfer pump: with air stripper blower and transfer pump motor starters, HOA switches, green running lights, red stripper sump high level alarm light, red low air pressure alarm light, red high level alarm light for transfer tank, fuses and relays for controlling stripper blower, transfer pump and main disconnect.

2,324.00

CPMOTOR	1	addition motor control for Di Motor: motor control includes overload relay, control relay switch, and green running lig	contracto s, fuses,	x ·
CPIS	4	Control panel IS components 1 switches	for every	two 966.00
CPTIME	3	Elapse time meter mounted by each associated motor to indicate run time	·	300.00
CPINT	1	Intermittent operation		300.00
			TOTAL	4,589.00

NOTE: if site is Class I Division I or II the control panel must be remote mounted. Contractor is responsible for all electrical hook up and supplies between the controller and treatment equipment. APR 16 '96 15:23 QED

1,1,1-Trichioroethana

/ Trichtoroethylene (TCE)

→ Benzene

P.1/8

QED Stripper Performance Report for: Q0496-70285

Site: Eng Omaha District Tuesday, April 16, 1996. Date: Model version: 1.00b Flow (gpm): 50.0 50.0 Water Temp (F): Akitude (ft): 55.0 Air Temp (F): 420.0 Stripper Model: CFM: Stg6 Contaminant Influent Effluent ' Stg1 Stg2 8tg3 Stg4 Stg5 (dqq) (dqq) 3<u>366</u>-10.00 8.13 7.33 6.61 5.96 Acetone 9.02 5.37 Chloromehane [Methyl Chloride] 5.00 9.27 2.15 0.50 0.12 0.03 40.00 0.01 4.00 700.00 0,00 0.00 Ethylbenzene 0.00 0.00 0.00 0.00 5 1.00° Methylene Chloride 20.00 11.83 7.00 1 /4.14 1.45 2.45 0.86 1,1-Dichloroethylene 30.00 3,36 0.00 0.38 0.04 0.00 0,00 1,1-Dichloroethane 50.00 20,62 8.50 3,51 0.60 0.25 1.45 c-1,2-Dichloroethylene(ethene) 70.00 83.32 | 27.77 3.08 250.00 9.25 1.03 0.34

133.75 | 17.89

351.98 123.89 49.61

2.39

1378.61 316.76 72.789 18.72 1 3.84

0.32

18.35 | 5.40

Copyright: QED Treatment Equipment, P.O. Box 3725, Ann Arbor, MI 49103. PHONE: 1-888-624-2826, in MI: 313-886-2847, FAX: 1-313-995-1170.

1000.00

6000.00

1000.00

200.00

5.00

5,00

5/94

0.04

0.01

88.0

1.90

APR 16 '96 15:24 QED

P.3/8 :

QED Stripper Performance Report for: Q-Number

Site: Site data Flow (gpm): 50.0 Altitude (ft):		M V)	ate: lode) ver later Ten ir Temp (Tuesday, April 16, 1996. 1.00b 50.0 55.0					
Stripper Model: 8.4		C	FM;		420.0	_			:
Contaminant	Influent (ppb)	Effluent (ppb)	Stg1	Stg2	Stg3	Stg4	Stg5	Stg6	
1.1,2-Trichloroethane Tetrachloroethylone (Per)	2.00	5:00 5	0.88	0.37	Q.18	0.07.	0.03	0.01	:
	150.00	9.00 1200 200.00	17.43	2.03	0.24	0.03	0.00	0.00	
Toluene (Methylbenzene)	800.00	766.00	235.29	69.20	20.35	5.99	1.76	0.52	•
Vinyl Chloride(Chlorosthyle	ne)	,		•	-	•		į	.*
	1.00	2.00	0.00	00,0	0.00	0.00	0.00	0.00	
p-Xyl ene	10.00	4.00	3.23	1.05	0.34	0.11	0.04	0.01	

Gopyright: QED Treatment Equipment, P.O. Box 3726, Ann Arbor, Mi 48103. PHONE: 1-200-524-2026, In Mi: 313-885-2547, FAX: 1-313-995-1178.

QED Stripper Air Discharge Report for: Q0496-70285

Eng Omaha District Site:

Flow (gpm): 50.0 Altitude (ff):

Date: Model version: Water Temp (F): Air Temp (F):

Tuesday, April 16, 1998. 1.00b

50.0 55.0

Stripper Model:

8.4

CFM:

420 n

entithet modes: 0.4	,		GFM:		0		
Contaminant Acetone	Stg1	Štg2	Stg3	Stg4	Stg5	Stg8	
Lbahour	2.46E-05	4.68E-05	6.685-05	8.49E-05	1.01E-04	4 404	
ppmY	6.04E-09	1.15E-08	1.642-08	2.08E-08		1.16E-04	
Chloromehane (Methyl C	hioride)		-10-122-00	マ・ひなだったる	248E-08	284E-08	
Lbe/hour	7.69E-04	9.48E-04	9.89E-04	9.98 Ę- 04	4.00= 00		
ppmV	2.17E-07	2.87E-07	2.79E-07	2.82E-07	1.00E-03	1.00E-03	
Ethylbenzene	į.		~1 9€-01	7.02E-U1	2.82E-07	2.82E-07	
Lbe/hour	1.00E-04	1.00E-04	1.00E-04	1.00E-04	4.007.04		
PPmV	1.34E-08	1.345-08	1.34E-08	1.34E-08	1.00E-04	1.00E-04	
Mathylene Chloride		***************************************		1.045-00	1.34E-08	1.34E-08	
Lbelhour	2.05E-04	3.26E-04	3.97E-04	4.39E-04			
ppmV	3.43E-08	5.46E-08	6.66E-08	7.37E-08	4.64E-04	4.79E-04	
1,1-Dichloroethylene	•		0.002-06	1.31E-08	7.79E-08	8.04E-08	
Lbs/hour	6.67E-04	7.42E-04	7.50E-04	7.51E-04	75400 63		
ppmV	6.33E-08	7.04E-08	7.12E-08	7.51E-04 7.13E-08	7.51E-04	7.51E-04	
1.1-Dichloroethane	2	1.032-00	1.125-00	7.132-08	7.13E-08	7.13E-08	
Lbe/hour	7.36E-04	1.04E-03	1.16E-03	1.22E-03	454		
Vmqq	1.06E-07	1.50E-07	1.68E-07	1.76E-07	1.245-03	1.25E-03	
c-1,2-Dichloroethylene(eth	tene)	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,100E-01	1.70E-07	1.78E-07	1.795-07	
Lbs/hour	4.17E-03	5.58E-03	6.03E-03	0 405 00			
ppmV	6.13E-07	8.17E-07	8.86E-07	6.18E-03	6.23E-03	6.25E-03	
1,1,1-Trichloroethane		0.17 2-02	0.005-01	9.08E-07	9.16E-07	9.18E-07	
Lbs/hour	2,17E-02	2.46E-02	2.50E-02	^ ====			
ppmV	2.32E-06	2.635-06	2.50E-02 2.67E-06	2.50E-02	2.50E-02	2.50E-02	
Trichioroethylene (TCE)	3326-00	2002-00	2.072-08	2.67E-06	2.67E-0 8	2.67E-06	
Lbs/hour	1.16E-01	1.42E-01	1.48E-01	4 505 44			
ррmV	1.25E-05	1.54E-05		1.60E-01	1.50E-01	1.60E-01	
Benzene			1.81E-05	1.62E-05	1.63E-05	1.63E-05	
Lbs/hour	1.625-02	2.19E-02	2 205 00		_		
opmV .	2 055 06	4.000.00	2.39E-02	2.46E-02	2.49E-02	2.50E-02	
Copyright: QED Treatment En	lioment P.O. DA	- 1750 A-A A-	4.37E-06 bor, MI 48103.	4.50E-08	4.64E-06	4.56E-06	
HONE- 1-800-824-2028, In MI-	Alle 11 75.47, F	X: 1-313-816-1	176				

Ma hold for the

AR309353

P.4/E

QED Stripper Air Discharge Report for: Q-Number

Site: Site data Flow (gpm): 50.0 Altitude (ft):	(gpm): 50.0 Model version: 1.00b Water Temp (F): 50.0				1996.		
Stripper Model: 8.4	N	C	FM:	420.0			
Contaminant 1,1,2-Trichlorosthane	Stg1	Stg2	Stg3	Stg4	Styf	Stg6	
Lbe/hour	2.86E-05	4.09E-05	4.61E-05	4.84E-05	4.93E-05	4.98E-05	
ppmV	3.06E-09	4.36E-09	4.93E-09	5.17E-09	5,27E-09	5.31E-00	
Tetrachloroethylene (Per	.)	•			,		
Lbe/hour	3.32E-03	3.70E-03	3.75E-03	3.75E-03	3.75E-03	3.76E-03	-
Vmqq	2.85E-07	3.18E-07	3.22E-07	· 3.22E-07	3,23E-07	9.23E-07	
Tolvene (Mathylbenzene)							
Lbs/nour	1.41E-02	1.83E-02	1.05E-02	1.995-02	2.00E-02	2.00E-02	
ppmV	2.19E-06	2.83E-06	3.02E-06	3.07E-08	3.09E-06	3.09 E- 08	1
Vinyl Chloride(Chloroethy	lene)				•		ł
Lbe/hour	2.50E-05	2.50E-05	2.502-05	2.50E-05	2.60E-05	2.50E-05	
ppmV	5,70E-08	5.71E-09	5.71E-09	5.71E-09	5.71E-09	5.71E-09	1
p-Xylene		•					
Lbs/hour	1.69E-04	2.24E-04	2.42E-04	2.48E-04	2.49E-04	2.50E-04	ļ
ppmV	2.27E-08	3.01E-08_	3.25E-08	3.32E-08	3.35E-08	3.36E-08	ļ

Copyright: QED Treatment Equipment, P.O. Box 8728. Ann Arbor, Mt 48103. PHONE: 1-800-624-2026, in Mt: 313-985-2647, FAX: 1-313-995-1170.

0.3977 | biffin # 24 his = 9.5 | hs/d # 20d = 1286 lbfin | 1500 | 2 16/hr | 500

Sty = 0.782 16/ n.e.

Sty = 0.2302 100/ n.e.

- 4 0.2433 16s/ha

0.2433 /bs x 12 has = 2.92 lbs/d x 30d = 438 /bs/month

AR309354

A-167

AFR 16 '96 15:25 QED

P.5/8

QED Stripper Performance Report for: Q0496-70285

Sito: Eng Omaha District Tuesday, April 16, 1996. Date: 1.00b Model version: 50.0 Flow (gpm): 50.0 Water Temp (F): Air Temp (F): Altitude (ft): 55.0 12.4 CFM: Stripper Model: 600.0 Contaminant Influent Effluent Stg1 Stg2 Stg3 Stg6 Stg4 Stg5 (ppb) (ppb) Acetone 10.00 1.00 8.81 7.78 6.83 6.02 6.30 4.67 Chloromehane (Methyl Chloride) 40.00 5.00 4.70 0.55 0.06 0.01 0.00 0.00 4.00 Ethylbenzena 700.00 0.00 0.00 0.00 0.00 0.00 0.00 20.00 Methylene Chlorkie 1.00 7.47 2.79 1.04 0.39 0.15 0.05 1,1-Dichloroethylene 30.00 7.00 1.60 0.09 0.00 0.00 0.00 0.00 1,1-Dichloroethane 50.00 1.00 11.60 2.69 0.62 0,14 0.03 0.01 o-1,2-Dichloroethylens(athens) 44.84 250.00 70.00 8.04 1.44 0.28 0.05 0.01 1.1.1-Trichloroethane 1000.00 200.00 64,41 4,15 0.27 0.02 0.00 0.00 Trichloroethylene (TCE) 6000.00 5.00 698.18 81,24 9.45 1.10 0.13 0.01 Benzene 1000.00 6,00 191.03 36.49 6.97 1.33 0.25 0.05

Copyright: QED Treatment Equipment, P.O. Box 3726, Ann Arbor, Mt 48103. PHONE: 1-800-824-2028, in Mt: 313-836-2547, FAX: 1-513-896-1170.

APR 16 '96 15:27 QED

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QED Stripper Performance Report for: Q-Number

Site: Site dala Flow (gpm); 50.0 Altitude (ft):	Date: Model version: Water Tømp (F): Air Temp (F):			Tuesday, April 16, 1896. 1.00b 50.0 55.0					
Stripper Model: 12.4	,	C	FM:	•	600.0	,			•
Contaminant	influent (ppb)	Effluent (ppb)	Stg1	Stg2	Stg3	Stg4	Stg5	Stg6	•
1,1,2-Trichloroethune	2.00	5.00	0.51	0.13	0.03	0.01	0.00	0.00	•
Tetrachloroethylene (Per))	,							•
	150.00	9.00	8.31	0.48	0.03	0.00	0.00	0.00	
Toluene (Methylbenzene)	800.00	700.00	124.91	19.50	3.05	0,48	0.07	0.01	
Vinyl Chloride(Chloroethyl	ene)	*							
· · · · · · · · · · · · · · · · · · ·	1,00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	
p-Xylene	10.00	1.00	1.73	0.30	0.05	0.01	0.00	0.00	

Copyright: QED Treatment Equipment, P.O. Box 3726, Ann Arbor, MI 48103. PHONE: 1-808-624-2026, in Mi: 313-996-2847, FAX: 1-313-696-1170.

APR 16 '96 15:26 QED

P.6/8

QED Stripper Air Discharge Report for: Q0496-70285

Eng Omaha District

50,0

Date:

Flow (gpm): Altitude (ft):

Model version:

Tuesday, April 16, 1996. 1,005 50.0 65.0

Water Temp (F): Air Temp (F):

Stripper Model:	12.4	C	FM:	600.0			<u> </u>
Contaminant	Stg1	Stg2	Stg3	Stg4	Stg5	Stg6	
Acetone							
behour	2.99E-05	5,62E-05	7.93E-05	9,97E-05	1.18E-04	1.34E-04	į
Vmqc	5.13E-09	0.64E-09	1.36E-08	1.71E-08	2.02E-08	2.29E-08	Ì
Chloromehane (Met	hyi Chloride)	•		•		-	
_bs/hour .	8.84E-04	9,88E-04	1.00E-03	1.00E-03	1.00E-03	1.00E-03	Į
Vmqq	1.75E-07	1.95E-07	1.97E-07	1.98E-07	1.98E-07	1.98E-07	± -
Ethylbenzene	•						
bé/hour	1,005-04	1.00E-04	1.00E-04	1.005-04	1.00E-04	1.00E-04	i
ppmV	9.41E-09	9.41E-09	9.41E-09	9.41E-09	9.41E-09	9.41E-09	-
Mathylena Chlorida					:		į
Lbe/flour	3.14E-04	4,31E-04	4.765-04	4.91E-04	4.97E-04	4.99E-04	-
Vmqq	3, 8 8E-08	5,06E-08	5.57E-08	5.76E-08	5.84E-08	5.86E-08	
1,1-Dichioraethylen	6						
Lbs/hour	7,11E-04	7.49E-04	7.51E-04	7.51E-04	7.51E-04	7.51E-04	-
ppmV	4.73E-08	4.98E-08	4.99E-08	4.99E-08	4.99E-08	4.99E-08	
1,1-Dichloroethane	,	,			-	•	į
Lbe/hour	9.61É-04	1.18E-03	1.24E-03	1,25E-03	1.25E-03	1.265-03	ļ
ppmV	9.69E-08	1.19E-07	1.25E-07	1.265-07	1.26E-07	1.26E-07	
c-1,2-Dichloroethyk	ene(othene)				;		}
Lb&/hour	5.14E-03	6.06E-03	6.22E-03	6.25E-03	6.26E-03	6.26E-03	}
Vmqq	5.28E-07	6.23E-07	6.40E-07	6.43E-07	6.44E-07	8.44E-07	*
1,1,1-Trichloroethau	пе				•		1
Lbelhour	2.346-02	2.49E-02	2.50E-02	2.50E-02	2.50E-02	2.50E-02	
Vmqq	1.75至-06	1.86E-05	1.87E-06	1.87E-06	1.87E-08	1.87E-06	}
Trichlaroethylene (TCE)				j		
Lbs/hour	1.33E-01	1.48E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	
ppmV	1.01E-05	1.12E-05	1.14E-05	1.14E-05	1.14E-05	1.14E-05	į
Benzene					l -		į
Lbc/hour	2.03E-02	2.41E-02	2.49E-02	2.50E-02	2.50E-02	250E-02	}
	2,59Ē-08	3.08E-06	3.17E-08	3.19E-06	3.20E-06	3.20E-06	}

APR 16 '96 15:27 QED

QED Stripper Air Discharge Report for: Q-Number

Site data Site: Flow (gpm): Altitude (ft):

50.0

Date:

Tuesday, April 18, 1996.. 1.00b

Model version: Water Temp (F): Air Temp (F):

50.0

55.0

Stripper Model:	2.4	. C	FM;	600.0	· <u></u>	
Contaminant	Stg1	Stg2	Stg3	Stg4	Stg5	Stg6
1,1,2-Trichloroethane						
Lbs/hour	3.73E-05	4.68E-05	4.92E-05	4.99E-05	5,00E-05	5.01E-05
ppmV	2.79E-09	3.50E-09	3.88E-D9	3.73E-09	3.74E-09	3.74E-09
Tetrachloroethylene (i	Per)					
Lbefraur	3.55E-03	3.74E-03	3.75E-03	3.76E-03	3.76E-03	3.76E-03
ppmV	2.13E-07	2.25E-07	2.28E-07	2.262-07	2.26E-07	2.26E-07
Toluene (Měthylbenza	ne)					
Lbs/hour	1.69E-02	1.65E-02	2.00E-02	2.00E-02	2.00E-02	2.00E-02
ppmV	1.83E-06	2.11E-06	2.18E-06	2.17E-06	2.17E-08	2.17E-06
Vinyl Chloride(Chloro	ethylene)				,	
Lbs/hour	2.50E-05	2.50€-05	2.50E-05	2.506-05	2.50E-05	2.50E-05
ppmV	3,99E-09	3.99E-09	3.99E-09	3.99E-09	. 3.09E-09	3.99E-09
p-Xylene		•				
Lbe/hour	2.07E-04	2.43E-04	2.49E-04	2.50E-04	2.50E-04	2.50E-04
ppmV	1.95E-08	2.28E-08	2.34E-08	235E-08	2.35E-08	2.35E-08

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SECTION 1000 ENGINEERING SPECIFICATION: AIR STRIPPER (REMOVABLE TRAY)

PART 1- GENERAL

•	•
1.1	SCOPE
1.1.1	The manufacturer shall furnish a low profile, multi-tray Air Stripper for removal of volatile organic compounds from water. System shall be manufactured by QED Environmental Systems, Inc. and represented by or pre-approved equivalent.
1.2	PROCESS DESCRIPTION
1.2.1	The air stripper process must allow influent water to be piped to the air stripper inlet distribution port. The water is then allowed to flow over a weir and through a series of sieve/aeration trays as it descends to a sum at the bottom of the unit. Air forced up through the sieve holes in each tray forms a froth of bubbles, generating a large surface area. Depth of froth and unit air-to-water ratio are carefully controlled to optimize the contaminant removal process. This allows mass transfer of contaminants from the water into the rising air, which is exhausted at the top of the unit A demister pad prevents release of water droplets in the exhaust.
1.3	SUBMITTALS
1.3.1	Manufacturer shall submit the following with the bid:
1.3.1.1	Product data for selected model, including rated flow capacity, dimensions, weights (dry and operating), accessories, and warranty coverage.
1.3.1.2	Drawings and/or data sheets containing all information necessary to relate the equipment to the specifications.
1.3.1.3	List of all instrumentation to be provided, with descriptive information for each component. See attached Air Stripper Data Sheet for list of required instrumentation.

SECTION 1000: AIR STRIPPER SPECIFICATIONS (REMOVABLE TRAY) REV 980314 Copyright 1998 QED

PART 2 — PRODUCTS

2.1	GENERAL
2.1.1	The air stripper shall be an E-Z Tray TM Removable-Tray Air Stripper or pre-approved equivalent (low profile, multiple sieve tray design using pressure rather than vacuum to generate airflow). See Data Sheet for model number.
2.1.2	All components and options shall meet requirements specified on the Data Sheet attached to this specification.
2.2	EQUIPMENT DESIGN REQUIREMENTS
2.2.1	Standard product design shall include one low-profile aeration unit shell with the following specifications:
2.2.1.1	The shell shall accommodate slide-out removable, interchangeab sieve trays for easy cleaning.
2.2.1.2	Access to the individual trays shall be provided via a removable front hatch, without requiring removal of influent, effluent, or air discharge piping. The hatch shall be constructed of transparent material to allow visual observation of stripper operation.
2.2.1.3	The air stripper shell dimension shall be no smaller than the size specified on the attached Data Sheet.
2.2.1.4	The shell shall be of one piece welded construction; to minimize seal and gasket requirements, 5 sides shall be imperforate except for welded or flanged fittings used for air, liquid, or sensor connections.
2.2.1.5	The air stripper shall be equipped with integral sump, tray support tracks, and a high efficiency demister, plus an external sump gauge to allow visual observation of water level, plus a high efficiency demister. Demister shall effectively remove water droplets at air flow velocity greater than stripper blower maximum capacity. See Data Sheet for demister specifications.
2.2.1.6	Shell construction shall be of epoxy coated mild steel or uncoated stainless steel; see Data Sheet for specific requirements. Construction must be suitable for all loads placed on shell.

SECTION 1000: AIR STRIPPER SPECIFICATIONS (REMOVABLE TRAY) REV 960314 Copyright 1996 QED

including but not limited to: loads resulting from internally

	supported parts, weight of operating liquid, piping, structural supports, internal or external pressure.
2.2.1.7	Shell design shall include mounting brackets suitable for hold- down on a skid or floor, plus forklift cutouts and/or lifting lugs to allow the unit to be moved easily without damage.
2.2.2	Standard product design shall include removable sieve trays with the following specifications:
2.2,2.1	Trays shall be constructed of stainless steel with a slide-out design. See Data Sheet for full specifications.
2.2.2.2	Trays shall have latches designed to hold them in position on the shell slide tracks.
2.2.2.3	Trays shall include a mechanical flow control device which will regulate water volume in each tray, preventing air short circuiting.
2.2.2.4	Trays shall be supplied with engineered perforations, sized and located to maintain not less than the specified active area of optimum mass transfer (not including seal pot or downcomer area). See Data Sheet for full specification.
2.2.2.5	Design shall allow the option of purchasing a set of spare trays. (This option reduces system downtime by allowing operation to resume without a delay for tray cleaning. It may also permit easier tray cleaning i.e. by setting trays aside, calcium or iron fouling can dry on them so it can simply be cracked off.)
2.2.3	Standard product design shall include piping connections.
2.3	OPERATION AND PERFORMANCE PARAMETERS
2.3.1	Stripper must be fully accessible for cleaning from front only.
2.3.2	Dry weight of individual trays or other removable components must not exceed 75 pounds (to allow one-person cleaning).
2.3.3	Design shall require a maximum clearance not to exceed 4" at the rear and at least one side to allow placement in a corner without interfering with operation or cleaning.

SECTION 1000: AIH STRIPPER SPECIFICATIONS (REMOVABLE TRAY) REV 960314 Copyright 1996 QED

	•
2.3.4	Air to water ratio shall be kept in accordance with generally accepted chemical engineering practice as defined in Perry's Handbook; see Data Sheet for exact specifications.
2.3.5	Design flow shall be as specified on attached Data Sheet or on Performance Model Run printout.
2.3.6	Design temperature (water and air) and site altitude shall be as specified on attached Data Sheet or on Performance Model Run printout.
2.3.7	Design influent and effluent concentrations shall be as specified on attached Data Sheet or on Performance Model Run printout.
2.3.8	Air stripper shall be installed in accordance with manufacturer's recommendations, including but not limited to the following:
2.3.8.1	If an exhaust stack is installed to provide venting of the stripped air, the size of the exhaust shall be in accordance with manufacturer's recommendations (see Data Sheet for specification).
2.3.8.2	If air stripper exhaust is to be passed through a subsequent treatment device (such as vapor phase activated carbon), back pressure shall not exceed manufacturer's recommendations (see Data Sheet for specification). If design post-treatment back pressure exceeds this level, a suitable auxiliary blower consistent with manufacturer's recommendations must be installed.

SECTION 1000: AIR STRIPPER SPECIFICATIONS (REMOVABLE TRAY) REV 960314 Copyright 1996 QED

ENGINEERING DATA SHEET 1 AIR STRIPPER (REMOVABLE TRAY)

GENERAL PRODUCT DATA

Model No.	Max. Flow (GPM)	Dry Weight (lbs)	Oper. Weight (lbs)	Shell Dimension (*LxWxH)	Trays (no x lbs)	Active Area per tier (sq ft)	*Required Clearance (Inches)	
4.4	1-25	630	985	27 x 26 x 82	4 x 29	2.8	4 X < 27	 -
4.6	1-25	780	1,219	27 x 26 x 102	6 X 29	2,8	4 x <27	
6.4	1-40	790	1,285	35 x 26 x 82	4 x 40	3.8	4 x <35	1(,
8.8	1-40	978	1,591	35 x 26 x 102	6 x 40	3.8	4 x <35	68"-
8.4	1-50	955	1,580	47 x 26 x 82	4×50	5.6	4 x < 47	WD.
8.6	1-50	1,182	1,956	47 x 26 x 102	6 x 50	5.6	4 x <47	- " 11]
12.4	1-75	1,165	2,105	71 x 26 x 82	4 x 74	8.8	4 x <71	50" W
12.6	1-75	1,442	2,606	71 x 26 x 102	6 x 74	8.8	4 x <71	
16.4	1-100	1,625	2,870	47 x 53 x 82	8 x 50	11.1	4 x <47	07 H
16.6	1-100	2,011	3,553	47 x 53 x 102	12 x 50	11.1	4 x <47	87 H
24.4	1-150	<u>2,</u> 100	3,980	72 x 53 x 82	8 x 74	17.5	4 x <72	J .
24.6	1-150	2,599	4,926	72 x 53 x 102	12 x 74.	17.5	4 x <72	

^{*}Required clearances (back/sides by front, installed on standard skid)

INSTALLATION DATA ,

Model No.	Water Iniet (* FNPT)	Water Outlet (* FNPT)	Blower Inlet (* flange)	Exhaust Outlet (* O.D. pipe)	Water drain (* FNPT)	+Exhaust Stack size (inches)	*Max. back pressure ("H ₂ O)
4.4	2	3	4	4.5	1	4	10
4.6	2	3	4	<i>4.</i> 5	1	4	5
6.4	3	4	4	6.63	1	6	10
6.8	3	4 .	4	6.63	1	6	5 -
8.4	3	4 🐇	4	6.63	1	6	10
8.8	3	4	4	6.63	1	6	5
124	4	4	6	6.63	1	6	10
12.6	4	4	6	6.63	1	6	5
18.4	8	4	6	6.63	1	6	10
16.6	8	4	6	6.63	1	6	5
24.4	6	6	8	8.63	1	8 .	10
24.6	6	6	8	8.63	1	8	5

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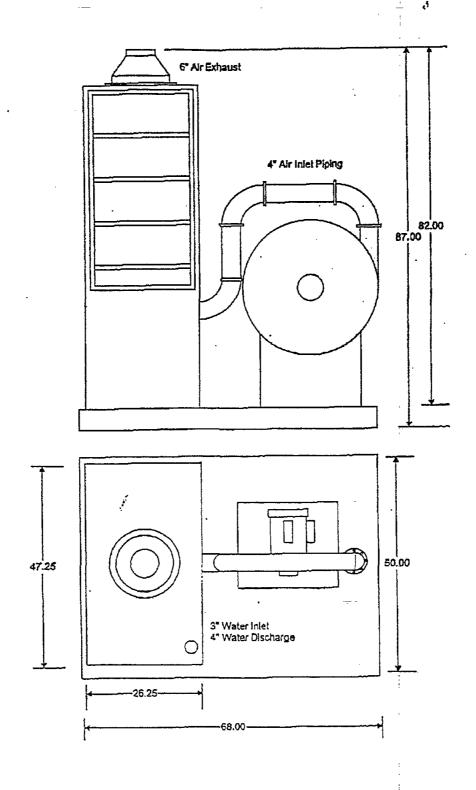
⁺ Minimum recommended nominal diameter of exahust stack, if added * Maximum clean-tray exhaust back pressure allowed without auxillary blower

ENGINEERING DATA SHEET 2 AIR STRIPPER (REMOVABLE TRAY)

HEL	iicm	SPECIFICATIONIST	
1.3.1.3	Standard	Differential pressure gauge, dia	nheram actuated
	Sump pressure gauge:	dial type, 0-50" H₂O range	prinagiiiractuateu
	Sump sight gauge:	Clear tube connected to sump	vater drain for
	Julip aigit gaage.	visual sump water level monitor	ring
	Recommended options	,	9
	Sump high level switch:	PVC lacketed SPST, 20VA	Check If Included (
	Sump low pressure switch:	SPST, 15VA, EXP	Check if included C
	Options		011001111111111111111111111111111111111
	High pressure switch:	SPST, 15VA, EXP	Check if included 0
	Air flow sensot:	Pitot tube	Check if included (
•	Air flow gauge:	Differential pressure gauge,	
	All lion gauge.	diaphragm-actuated dial type:	
		0-0.25" H₂O range (6.X models)	Check if included D
		0-0.5* H ₂ O range (4.X, 8.X)	Check if included C
	•	0-1" H ₂ O range (12.X, 24.X)	Check if included C
		0-2" H ₂ O range (16.X)	Check if included C
	1 to all these significances		Check if included C
	Liquid flow meter:	Digital in-line or	
		mechanical brass nutating disk	
	Pump on/off switch:	PVC jacketed SPST, 20VA	Check if included C
2.2.1.5	Demister:	High efficiency polypropylene	
	•	(98% removal of drople	ts @ 10 microns)
2.2.1.6	Shell material (check one):	☐ Epoxy coated mild steel	
		 304 stainless steel (uncoated 	() ·
	Wall thicknesses:	10 GA (0.14")	3
	Surface preparation:	SSPC-SP6 Commercial Blast	
	Interior coating:	One coat: coal tar, 14-20 mls di	
	Exterior coating:	First coat: epoxy primer, 4-6 ml	s dry film
		Second coat: epoxy finish, 1.5-	2.5 mls dry film
2.2.2.1	Tray material:	304 stainless steel	
001		EQ.4	
2.3.4	Minimum air/water ratio:	50:1	On man miles should
2.3.5	Design flow for this spec:	GPM	Or see altached
2.3.6	Design temperature for this spec:	°F (water)	Or see attached
		°F (air)	Or see attached
. •	Site altitude:	feet above sea level	Or see attached ()
2.3.7	Design concentrations for this	Contaminant influent ppb E	fluent ppb
	spec:		
_			
	<u>-</u>		
	÷		Or see attached 🗇

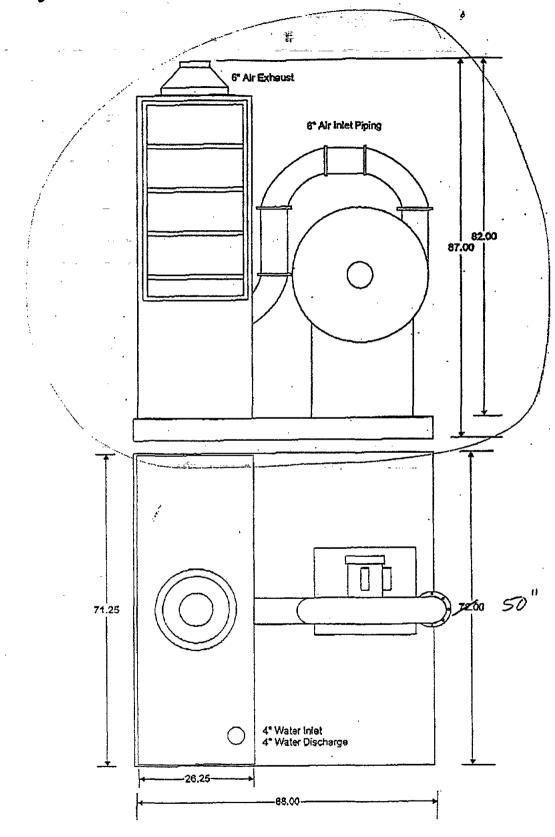
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EZ-Tray Model 8.4



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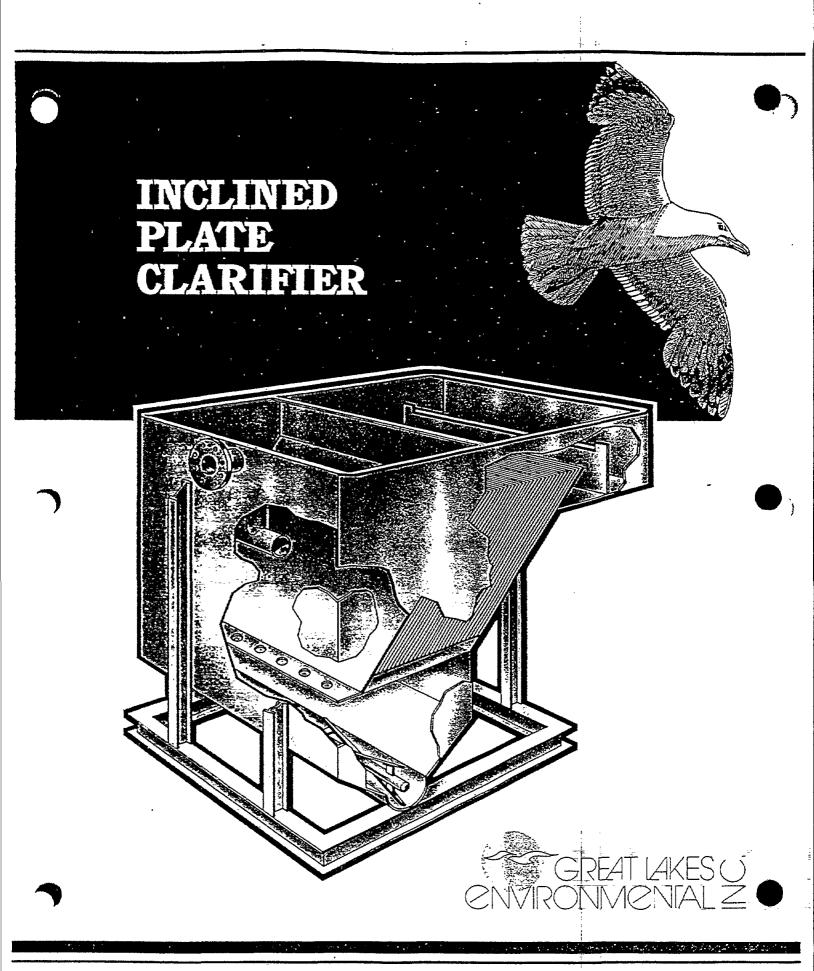
EZ-Tray Model 12.4

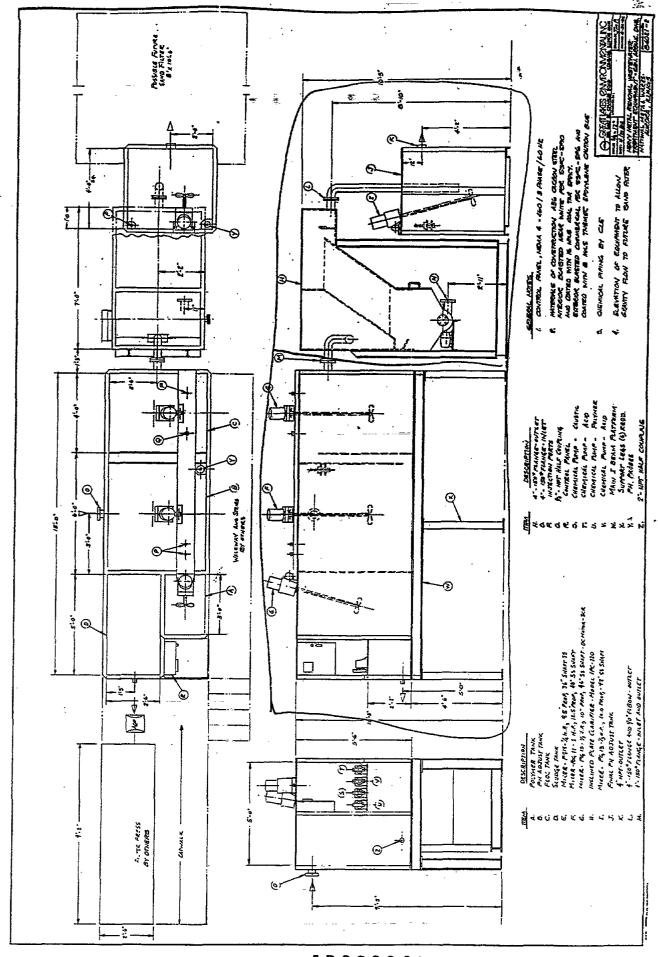


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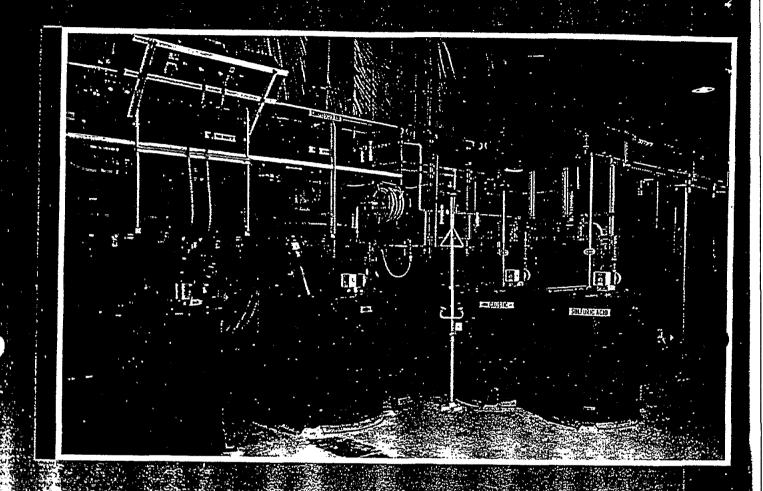


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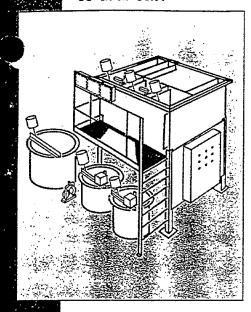
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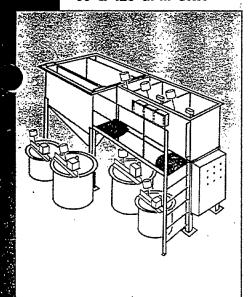
Vasiewater Treatment Units



Lancy Environmental Systems, Inc. 30 GPM UNIT



60 & 120 GPM UNIT



The Lancy ECONO-TREAT is a skid mounted versatile and economical physical/chemical treatment module designed to reduce levels of heavy metals and suspended solids to acceptable discharge standards. The Lancy ECONO-TREAT has been successfully utilized as both pre-treatment and post-treatment in the following markets.

- **■** Chemical
- Electronics
- Electroplating
- Groundwater Remediation
- Iron and Steel
- Landfill Leachate
- Metal Finishing

Five separate systems, each in three different flow capacities - 30, 60, and 120 GPM - are designed for easy installation and operation.

Proper selection and specification of both treatment chemistry and equipment is critical to the effectiveness of any treatment system. Lancy engineers have given careful attention to the following design parameters:

- Hydraulic and chemical loadings
- Treatment chemistry options and reaction kinetics
- pH and ORP adjustment and control
- Agitation rates particularly important in the flocculation stage
- Solids settling characteristics for proper clarifier performance
- Materials of construction
- Special treatment requirements

The result of these engineering efforts is an efficient, compact, integrated chemical treatment unit design which provides dependable performance and economical operation.

Design Criteria

Lancy ECONOTREAT units are designed to meet EPA and state effluent discharge limitations from incoming waste streams having the following maximum concentrations:

Total Heavy Metals

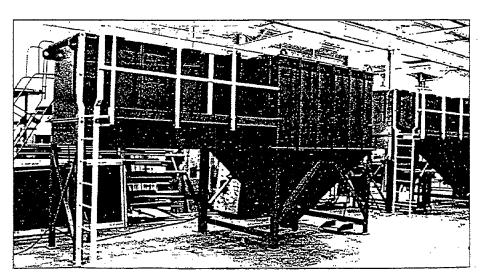
To produce up to 300 ppm total suspended solids (TSS) after flocculation

- Hexavalent Chromium (Cr⁺⁶) To produce up to 150 ppm TSS after flocculation
- Cyanide (CN⁻)
 To produce up to 150 ppm TSS after
 Flocculation
- Total Acidity
 To product 1,000 ppm TSS expressed as CaCO₃

All chemical feed concentrations and chemical feed pump sizes are based on these design parameters.

The influent should have no free or emulsified oil and grease which could foul controls and probes. Separate equipment can be provided to handle such streams.

If the design criteria of the Lancy ECONO-TREAT does not apply for your application, please contact us, for we have additional modularized equipment which may fit your needs.



Technical Data

Selection

The Lancy ECONO-TREAT unit best suited to your needs can be selected from Table 1. Custom designed systems or optional auxiliary equipment are available for special applications.

Sizing

Unit sizing is a function of both the hydraulic loading and the total suspended solids concentration of influent to be treated. As shown in Tables 1 and 2, each Lancy ECONO-TREAT model will service the listed hydraulic flow rate or any flow rate in the specified range.

TABLE 2

TABLE 1

MODEL NUMBER	MAXIMUM HYDRAULIC RATING (gpm)	UNIT DESCRIPTION*
ET30-A ET50-A ET120-A	30 60 120	EQUALIZATION SINGLE-STAGE ph adjustment
ET30-8 ET60-8 ET120-B	30 60 120	DUAL STAGE PH ADJUSTMENT
ET30-C ET60-C ET120-C	30 60 120	CYANIDE OXIDATION ph adjustment
E130-D E160-D E1120-D	30 60 120	DUAL STAGE CYANIDE OXIDATION
ET30-E ET50-E ET120-E	30 60 120	CHROME REDUCTION PH ADJUSTMENT

*Flocculation reactor & inclined Corrugated Plate Solids Separator are common to all units.

	MODEL NUMBER	HAX** HYDRAULIC RATING (GPM)	SHIPPING WEIGHT (Bos.)	OPERATING WEIGHT (lbs.)	
	ET30 - A ET30 - B ET30 - C ET30 - D ET30 - E	30	6,000	22,200	
	E160 - 8 E160 - C E160 - D E160 - E	80	8,400	40,003	The second secon
والمراكبة والمراكبة	ET120 - A ET120 - B ET120 - C ET120 - D 'ET120 - E	120	13,000	64,000	
		SE 255			<u>arkunit</u> ingrafi

Versatility

To illustrate the flexibility of ECONO-TREAT unit designs, a user who must treat both chrome and cyanide containing waste can accomplish this most economically by adding a separate Lancy Chrome Reduction Module and transfer station to any standard Lancy ECONO-TREAT Cyanide Oxidation Unit. Additional flexibility is achieved by applying other standard Lancy Treatment or Recovery Modules or equipment as dictated by process needs.

Electrica

All units are supplied with a 115 volt_NEMA-12 enclosure (NEMA-3 or 4 also available) to house alarms, power switching components, and protective devices. Each panel is completely inspected and tested prior to shipment. All motors are wired for 115 volt, single-phase service. Customers need only supply a 115 volt, 60 Hz power circuit rated for 90 amps.

One half century of wastewater treatment experience...

Installation and Maintenance Service

Each Lancy ECONO-TREAT unit comes complete with the following features and services:

- Prefabricated reactor and clarifier module
- Chemical feed systems
- Agitators
- Sludge transfer pump
- Process and electrical controls
- All necessary intrapiping and wiring

Instructions for site preparation, installation, checkout, operation and maintenance are also provided for use by your maintenance staff or contractor. If desired, Lancy will furnish installation supervision and operator and maintenance staff training. Also, periodic contract maintenance service is. available for optimum performance.

Start-Up

Routine start-up service by a Lancy Field service engineer is included in the price of each Lancy ECONO-TREAT unit.

Warranty

Lancy guarantees all of the equipment and waste treatment systems it supplies. While process guarantees are evalulated on an individual basis, Lancy ECONO-TREAT units will meet or exceed general metals treatment guidelines, provided influent characteristics are maintained. Supplemental equipment is available to meet more stringent requirements.

U.S.FILTER

Lancv Environmental Systems, Inc.

> 181 Thorn Hill Road Warrendale, Pennsylvania 15086-7527 = 17 Sulletin No. 1103 (412) 772-0044 Fax: (412) 772-1360

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Engineering and **Environmental Services**

Lancy maintains an experienced staff of waste treatment and recovery specialists. This allows Lancy to offer complete interdisciplinary engineering services associated with the design and installation of industrial wastewater treatment and recovery systems and equipment.

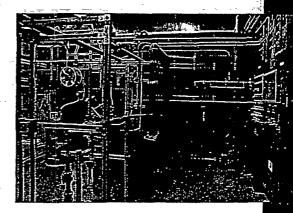
Optional Equipment

Pre-Treatment

- Holding Tanks
- Sumps or Auxiliary Lift Stations
- Pre-Treatment Equipment including chromium reduction module, cyanide oxidation module, oil/ water separator

Post-Treatment

- Sludge Handling Systems
 Continuous Sludge Thickener
- Filter Press for Sludge Dewatering
- Final Effluent Monitor
- Sorption Filter



Working with Lancy

We welcome the opportunity to discuss your specific application and how the Lancy approach to physical/chemical treatment can be applied to your wastewater need.

Lancy Environmental Systems, Inc. is a part of the U.S. Filter family of companies with the mission to be the leader in the development, design, and manufacturing of equipment, systems, and services for selected environmen-__tal markets.

Printed in U.S.A. __ 2000292

AR309372

The Great Lakes Inclined Plate Clariffer is a highly efficient gravity settler for the removal of suspended solids

ENERALINEORMATION

The Gat I childred Phit Clarifica (PC) are designed for the chicient removal of selficiable suspended solids from water the PC Mesign and performance is subcrown of the chick or tabe type clarifiers. Suspended solids in the efficient are offered than a (ew/PPM, climinating these pense of polishin sulfers), me IPCs are compact and equire only a quarrent of the flood pace of conventional clarifiers. It we call the major benefit

The inclined plate packs direct the solids to the sludge compartment, while baffles and weirs direct flow and control liquid level in the clarifier. The sludge compartment has pitched sides, access hatches and a mechanical thickening device. This arrangement insures positive removal of thickened sludge with easy access for maintenance.

The clarifiers are available in standard models ranging from 55 SQ FT to 2200 SQ FT. A major benefit is their low profile which allows installation in existing structures with low ceilings. The clarifiers operate by gravity and can be supplied with optional precoagulation/flocculation tanks plus polishing filters for the effluent.

DESIGN

The clarifiers are hydraulically sized for a maximum separation rate of 1.0 GPM/SQ FT based on effective surface area. Actual loading rates are dependent on the type of waste being treated and can be as low as 0.25 GPM/SQ FT for metal hydroxides. The loading rates are the same as would be used for a standard circular or rectangular clarifier without plate packs;

there it the design bothing for a conventional phalacers to 25 GPM SQ INC. The locality would be the single regime type dentities.

PARAGORIPARIS SDPARAGONIPRINGER

By house of parallelishate packs, a large setting arear can be incorporated into a relatively small space. To illustrate this, consider a Stream-containing particles of a certain density and size These particles would demonstrate a settling path as shown in figure A Settling a given height y for a given distance of horizontal stream travel Now, examine Figure B, which divides the flow into parallel sections. Each section allows the particle to settle at the same rate. This process of dividing the flow into parallel sections can proceed in this fashion until the hydraulic radius becomes small enough to produce turbulence.

The result of this flow division produces a net settling effect equal to the

FIGURE 8

AR309373

sum of the horizontal plates, and is directly comparable to the total horizontal area of a conventional offenbordarinese

Horzontal plates would allow the solids to accimulate on the plates and eventually be swept back into the flow of lead to playing. Therefore, the plates are fulfed presently at a 55° angle. Examining styring G, the particle would again softle-the given the site y for the given distance is of stream fravel. However, the stream furction is different producing a different particle direction as shown. Is cambe shown by vector analysis and ascambe seen graphically by the dashed lines between Figures B and C that the horizontal distance traveled until the particle contacts the lower plate as the effective plate area is equal to the actual plate area times the cosine of the angle of inclination from horizontal.

To insure proper solids settling and removal, the plate spacing must be sufficient so as to produce a hydraulic radius that allows the maximum flow to stay within viscous or streamlined flow. Even at the maximum hydraulic loading of 1.0 GPM/SQ FT, the Reynolds number for the Great Lakes IPC Clarifiers is quite low assuring streamlined flow.

OPERATION

Inlet and Diffusion Chamber

Flow enters the inlet chamber where it is dispersed through a non-clog diffuser across the width of the clarifier. At the bottom of the inlet chamber, orifices further direct the flow evenly under the plate pack. The orifices provide a slight back pressure

A-18=

of loss of head which results in even flow distribution are the same simp they are present in surfacion size and number so as not to surerease. In a litition.

Plate Packs

The IPC plate packs consist of seis of smooth surfaced polypropylene plate assembled into packs; Construction withize strainless sizely rods and PVC spacers. The plates are flocked in at the proper angle and spacing by a mingue design that provides both strength and rigidity. The plate pack is easily cleaned in place and can be removed in necessary. Plate packs are equipped with lifting eyes.

NOTE: Plate packs are available mother

NOTE: Plate packs are available in other than standard sizes for installation in other manufacturers clarifiers.

Sludge Chamber

The sludge chamber receives the settled sludge and collects it in a pitched bottom compartment. A sludge thickening mechanism is located in the bottom of the sludge compartment. This slowly rotating rake type device is designed to thicken the sludge and convey it to the discharge end of the clarifier. The slow rotation of the rakes allows the sludge to thicken by releasing entrained water. This thicker sludge facilitates dewatering operations. The sludge mechanism is driven through. chain and sprockets by a gearmotor. Access hatches are provided in the side of the sludge chamber.

Clean Water Chamber

As the clarified water passes upward through the plates it enters the clean water outlet chamber by cascading over an adjustable weir. The weir runs the full length of the clarifier to further insure even flow distribution throughout the plate pack.

KEVERREKES OF

Materials of construction inclines it At a thick A SeM A 30 structural quality curbon sizes), 364 and 316 standers sized. The standard plate material is size in releved polypropylene which can be used in applications requiring continuous superate to temperature up to 2004 for the sustant autoperates of the polypropylene are excellent formost applications. The plates can also be simplications in other materials, EVOs spacers and standers materials. EVOs spacers and standers assembly. All steels and welds are Magnatium, spot check resteed in accordance with military specifications.

COATINGS

All carbon steel surfaces are blast cleaned and epoxy coated. Interiors are coated with Coal Itar Epoxy and exteriors are coated with High Build Epoxy. Special coatings and rubber linings are available.

AVAILABLE OPTIONS

Oil Skimming/Flocculation Tanks
Polishing Filters
Pre and Post pH Control
Sludge Pump Out Systems
Solids Contact Recycle
Solids Effluent Monitor
Additional Sludge Capacity
Design Flexibility to Satisfy
Your Application

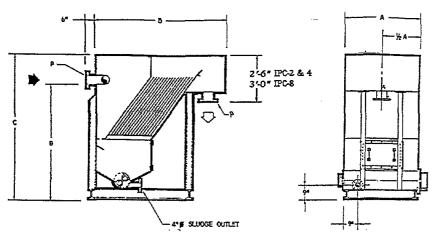
APPLICATIONS

Arr Scrubbers
Automotive
Chemical Plants
Plectrical Industries
Fabricated Metal Plants
Glass Factories
Metal Platers
Metal Platers
Metal Rydroxides
Military Bases
Military

For further information contact: Great Lakes Environmental, Inc., or our local representative. We will be glad to assist you in selecting a properly sized unit for your application.

GREAT LAKES ENVIRONMENTAL

AR309374



DIMENSIONS, WEIGHTS & CAPACITIES

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	PC-8-1100 IPC-8-1320	10' 12' 5	9'6"	116.	9.6°	(2) 10	4	8600 \$	47300
	IPC-8-1540 IPC-8-1760	14'	9'6"	11/-6"	9.67	(2) 12° (2) 12°	4	11100	265300 74800
	IPC-8-1980 IPC-8-2200	18' 20'	9'-6" 9'-6"	11'-6"	-9'-6" 9'-6"	(3) 12" (3) 12'	5 T	5	83900 92900

Model No. represents plate length and effective settling area.

Flow rates are established through settling tests but should not exceed 1.0 GPM per sq. ft. of settling area. Influent & effluent nozzles are sized for 1.0 GPM per sq. ft. of settling area. Smaller sizes for ower flows are available. Dimensions and capacities are for reference only and not for construction.



463 Vista · Addison, IL 60101 · (708) 543-9444 · FAX (708) 543-1169



MODEL-IPC

PERFORMANCE

The Great Lakes Environmental, Inc., Inclined Plate Clarifier design is based on the inclined parallel plate solids thickening principle to effectively remove suspended solids from a 150 deg F or less wastewater stream resulting in a high quality effluent. Underflow solids are mechanically thickened to reduce sludge volume.

DESIGN

GLE Model IPC-Inclined Plate Clarifier, shop fabricated, ready to install on a flat foundation and includes:

1) INLET CHAMBER

Water enters the clarifier through a non-clogging dispersion nozzle. The inlet chamber is a large reservoir to disperse and equalize the flow evenly across the width of the clarifier. Liquid enters the clarification chamber through multiple orifices for non-channeling, uniform flow control.

2) CLARIFICATION CHAMBER

Larger solids immediately settle into the sludge chamber while the water and fine particles flow upward between slick surfaced polypropylene plates inclined at 55 degrees with 1" spacing. The solids settle a very short distance onto the plate surfaces, slide to the bottom and drop into the sludge chamber. Effective settling area is determined by summing the horizontal projection of the individual plates.

Ultra violet light stabilized polypropylene plate packs are assembled in easily removable bundles with stainless steel and PVC fasteners. Stainless steel lifting lugs are included.

463 Vista, Addison, IL 60101; Phone: 708/543-9444, Fax: 708/543-1169

AR309376

A-189



MODEL-IPC

3) SLUDGE CHAMBER/THICKENER

The mechanical thickener in the sludge collection chamber gently induces the release of entrained water and moves the solids to a flanged discharge nozzle. Underflow will be uniformly thickened solids without compaction or channeling. Thickener extends the width of the clarifier and slowly rotates at 3 RPM. Shaft is constructed out of stainless steel with redwood blades. The thickener is driven through chain and sprocket coupling with 1/4 HP gear motor (115 VAC, 1 ph, 60 hz).

4) <u>EFFLUENT CHAMBER</u>

Clarified water overflows an adjustable stainless steel weir for even flow through the entire plate pack. Discharge is by gravity through a flanged nozzle.

5) HEIGHT

Clarifier is designed with a low height profile to facilitate installation in existing buildings and reduce the need for elevated access structures and walkways.

6) ACCESS HATCHES

Large, rectangular access hatches below the plate pack are furnished with water tight seals.

7) <u>CONSTRUCTION</u>

Tank shell and baffles are constructed of 1/4" thick A-36 carbon steel. Weld joints are double welded and leak tested. External structural members are carbon steel.

316 stainless steel and 304 stainless steel clarifiers will be constructed of 3/16" thick plate with carbon steel structural support.



MODEL-IPC

8) <u>COATINGS</u>

Interior surfaces will be prepared to SSPC-SP10, near white metal blast, and lined with coal tar epoxy, 10-12 dmt min.

Exterior surfaces will be prepared to SSPC-SP6, commercial blast, and coated with one coat polyamide epoxy primer followed by one coat of urethane overcoat for excellent chemical and weather resistance, 6 dmt min. Final color is Safety Blue.

9) ASSEMBLY

All components are installed, interwired and plumbed prior to shipment. Lifting lugs are provided at the balance points.

10) WARRANTY

Great Lakes Environmental, Inc., warrants its products to be free from material and workmanship defects for a period of one year from the date of shipment.

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A-19



MODEL-IPC

OPTIONAL EQUIPMENT

A) SLUDGE PUMP OUT

Air operated double diaphragm pump with air regulator, filter, lubricator and solenoid valve. Local NEMA (12) control panel with selector switch, run light and timer for intermittent or continuous sludge transfer to a storage tank. Selector switch will provide automatic operation with manual override.

MODEL	FLOW	TDH	AIR	PORTS
DDP-0.5	11 gpm	55'	70 psi (12 cfm)	1/2" In/Out
DDP-1.0	· 20 gpm	55'	70 psi (30 cfm)	1" In/Out
DDP-1.5	90 gpm	55'	70 psi (75 cfm)	1-1/2" In/Out

B) SOLIDS CONTACT RECYCLE

Solids contact recycle system to return settled sludge alternately to the chemical flocculation tank or the sludge storage tank on a timed basis. System consists of timer controlled three way air operated sludge diversion valve, air operated double diaphragm sludge pump, local control panel, timer and air control accessories.

Solids contact recycle is proven technology providing several performance benefits. Concentrated solids are returned to the flocculation chamber to increase the solids density. Larger flocculated particles are formed to:

- a) Promote capture of fine particles.
- b) Enhance clarity of the effluent water.
- c) Increase settling rate in the clarifier.
- d) Improve filtration of the sludge.

C) SLUDGE LEVEL DETECTOR

Infra red transmitter/receiver assembly installed in the sludge chamber to detect the sludge/water interface and provide on/off control. NEMA 4 electrical panel with relay and adjustable timer to automatically control the sludge discharge cycle by turning the sludge pump on and off.

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AR309379 A-192

COMPANY NAME - DATE DESIGN AND PERFORMANCE SPECIFICATIONS INCLINED PLATE CLARIFIER



MODEL-IPC

OPTIONAL EQUIPMENT - Continued



Dual chamber polymer flash mix and flocculation tank, carbon steel construction, rated for a minimum of 1/2 minute flash mix time and a minimum of 5.0 minute flocculation time at rated flow. Tanks will be elevated for gravity flow into the GLE Inclined Plate Clarifier. Mixers will be Lightnin, Philadelphia (or equal) 350 RPM, universal cup mount and stainless steel wetted parts. Flocculation mixer will have variable speed control, 0-350 RPM operation. NEMA 12 switch box with one switch for each motor, motor run light and variable speed controller.

E POLYMER FEED SYSTEM

[7 GPH or 20 GPH]

One (1) Pulsafeeder Model E Plus, (or equal) electronic chemical metering pump with teflon diaphragms and variable stroke/frequency adjustment. Polyethylene mix tank (45 gal.) with cover and mixer. NEMA 12 switch box with selector switches and motor run lights. Metering pump will be mounted on the Model FFT flash mix-flocculation tank and will be plumbed and wired before shipment.

SLUDGE STORAGE TANK (MODEL SST)

Carbon steel or polyethylene sludge storage tank with 45 degree cone bottom, underflow nozzle at bottom of cone and top overflow nozzle.

May 8, 1996



Ms. Janelle Mavis Corps of Engineers CEMRO-ED-DK 215 North 17th Street Omaha, NE 68102-4978

SUBJ: Great Lakes Environmental, Inc.

Waste Water Treatment Systems

GLE Proposal No. 96568

RE:

Boarhead Farms

Upper Black Eddy, PA

Dear Ms. Mavis:

Great Lakes Environmental, Inc., is pleased to provide you with a quotation for a heavy metals and volatile organics removal system.

Process Description

Water is pumped from various wells into a 2,000 gallon equalization tank. This tank will be equipped with float switches to automatically turn the feed pumps to the system in an alternating fashion. These pumps will be designed to pump 50 GPM to the system.

The groundwater will then be aerated to convert ferrous ions to ferric ions, while the pH is adjusted to 9 to precipitate heavy metals. Sodium sulfide is also added to precipitate metals to lower concentrations of dissolved metals.

adyrac

The precipitated metals and water then flow to a stilling chamber so as to release any residual air prior to flocculation. In the stilling chamber, additional ferric sulfate is added to co-precipitate the metals. This chamber is mixed with an agitator. In the flocculation chamber, a heavy weight anionic polymer is added, while being mixed with a variable speed mixer to flocculate the precipitated metals and solids. The water flows to a GLE Model IPC-4-220 Inclined Plate Clarifier where the flocculated solid particles are settled out of the groundwater stream. The expected effluent from the clarifier will be no more than a few parts per million of solids.

Effluent water from the clarifier will gravity flow into a feed/backwash holding tank sized to hold a volume of water equal to the rated backwash flow at 8 minutes per cell. (approximately 275 gallons).

315 South Stewart Avenue, Addison, IL 60101-3300; Phone: 708/543-9444, Fax: 708/543-1169
Web Site: http://www.gle.com E-Mail: GRTLAKESI@AOL.COM

AR309381



Ms. Janelle Mavis Corps of Engineers GLE Proposal No. 96568 May 8, 1996 Page Two

Process Description - Continued

Water from the TPF holding tank is then pumped via dual pumps operated in an alternating fashion at 50 GPM @ 115' TDH to the Model TPF-24-3 Tertiary Polishing Filter Sand Filters. Backwashing of the sand filters is accomplished using the filtered water from two of the cells to backwash the third. This can be done on an automatic basis via a preset differential pressure basis or timed basis.

Bill of Materials

Item 1 - Equalization Tank and Feed Pumps

One (1) 1,000 gallon flat bottom polyethylene tank with dual feed pumps to the system. NEMA 4 local control panel for automatic or manual control of feed pumps. Feed pumps are rated for 50 GPM @ 20' TDH.

Item 2 - Chemical Reaction Tanks

A three stage reaction tank for precipitation and flocculation of heavy metals, constructed of A-36 carbon steel with highly resistant coating system will be provided. The first two chambers of the unit will be rated for 10 minutes retention time, with a third chamber rated for 5 minutes retention time. A 7.5 HP blower with diffusion piping will be provided.

One (1) Model Great Lakes Instruments 672P will be mounted and wired in the first reaction tank to control the pH with caustic.

Three (3) chemical feed pumps, 0-10 GPH, will be mounted and wired on the skid for pumping caustic and sodium sulfide into the first chamber and pumping ferric sulfate into the second chamber.

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Web Site: http://www.gle.com E-Mail: GRTLAKESI@AOL.COM

AR309382



Ms. Janelle Mavis Corps of Engineers GLE Proposal No. 96568 May 8, 1996 Page Three

Bill of Materials - Continued

Item 2 - Chemical Reaction Tanks - Continued

One (1) Lightnin or equal, 1/3 HP constant speed mixer is mounted and wired into the second chamber of the tank.

One (1) Stranco or Polymax unit with integral dilution and aging for polymer addition. One (1) 1/3 HP variable speed mixer with SCR controller in flocculation tank.

One (1) NEMA 4 control panel for manual and automatic control of equipment.

Item 3 - Inclined Plate Clarifier

One (I) Great Lakes Environmental, Inc., Model IPC-4-220 Inclined Plate Clarifier with solids contact recycle with 1" air operated double diaphragm pump.

Item 4 - Tertiary Polishing Filter

One (1) Great Lakes Environmental, Inc., Model TPF-24-3 with dual feed/backwash pumps and feed tank is provided. Water is pumped via the feed/backwash pumps at 50 GPM @ 115' TDH. Unit is skid mounted.

Item 5 - Carbon Absorbers

Dual carbon absorbers, each 5' in diameter, piped to operate in a lead - bag fashion or to isolate an individual unit.

Item 6 - pH Adjustment Tank

One (1) 250 gallon A-36 coated carbon steel tank with 1/3 HP mixer and 0-10 GPH chemical metering pump for metering acid.

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Web Site: http://www.gle.com E-Mail: GRTLAKES1@AOL.COM

AR309383



Ms. Janelle Mavis Corps of Engineers GLE Proposal No. 96568 May 8, 1996 Page Four

Bill of Materials - Continued

Item 6 - pH Adjustment Tank - Continued

One (1) GLI Model 672P pH probe and controller to monitor and control pH. NEMA 4 control panel for manual and automatic control of equipment.

Item 7 - Sludge Dewatering

One (1) 3,000 gallon cone bottom sludge holding tank with 1" air operated double diaphragm pumps, controlled manually. Sludge holding tank is complete with decant valves. Sludge will be dewatered in a 24 cubic feed filter press designed to hold at least 10 days worth of sludge.

Item 8 - Control Package

A main control panel, complete with an auto dialer and fully programmable PLC will be provided. This system will be used to control the system and provide for interconnects between equipment. Panel will be NEMA 4 enclosure.

Budget Price For System ----

\$245,000.00 (+/- 15%)

If you have any questions, please feel free to call me.

Yours very truly,

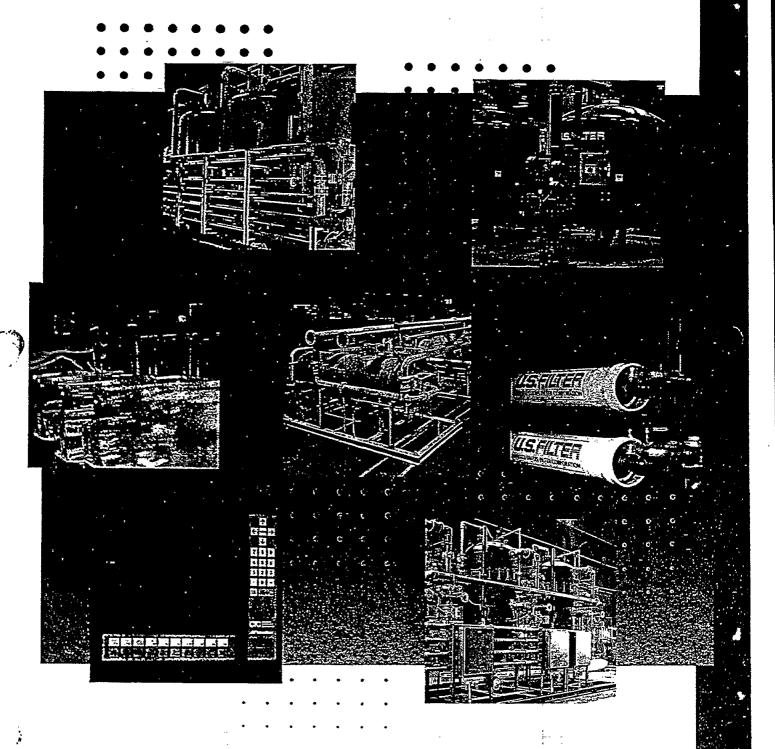
GREAT LAKES ENVIRONMENTAL, INC.

Patrick J. Dorn

Sales Engineer

PJD/vo

315 South Stewart Avenue, Addison, IL 60101-3300; Phone: 708/543-9444, Fax: 708/543-1169 Web Site: http://www.gle.com E-Mail: GRTLAKES1@AOL.COM Filtration Systems



U.S. FILTER
UNITED STATES FILTER CORPORATION

AR309385

RE-ASSEMBLED AND
RE-TESTED FILTER SYSTEMS
PROVIDE COST-EFFECTIVE
INSTALLATION.

and is ideal for treating river and other surface water sources. It can remove turbidity and organic matter with higher influent concentrations than can be filtered with downflow units. U.S. Filter's downflow product line is especially suited for upgrading water in plant and process, industrial wastewater, and municipal tertiary applications.

Auto-Shell filters are designed to remove oil contaminants and suspended solids from water used in steam-flooding and water-flooding in oil fields, as well as refinery wastewaters and other oil Denitrification multi-media filters biologically remove elemental nitrogen from wastewaters. This pological method has proven most cost-effective, efficient and easy to operate under all weather conditions. Denitrification filters also remove suspended solics.

AVGF (Automatic Valveless Gravity Filter) is a highly efficient gravity filter that operates automaticary without a single valve, backwash pump, flow-controller or other instruments/electrical connections. Nothing moves but the water! Its design and performance are proven through years of continuous use at hundreds of water treatment facilities worldwide. In addition to polishing clarifier effluent, one of the most popular applications is for side-stream cooling tower water filtration.

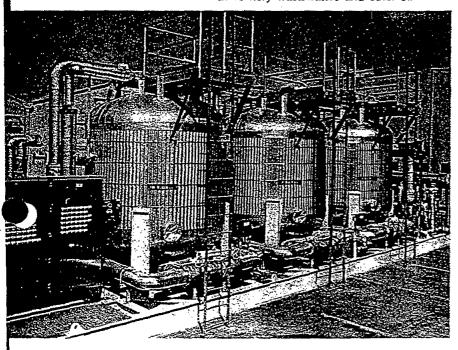
Carbon Filters remove organics (both naturally occurring and synthetic), chlorine, chlorates and other chlorine compounds, and are commonly used for pretreatment in ion exchange and reverse osmosis systems. Various activated carbon media are available to meet varying conditions and requirements.

IRON AND MANGANESE REMOVAL FILTERS

A complete line of manual and fully automatic Manganese Greensand and Birm filters are designed for either continuous potassium permanganate feed or cyclic permanganate regeneration of the greensand fron removal media. Birm filters are often used for iron removal, if dissolved oxygen content is adequate. Iron is oxidized from the soluble ferrous state to the insoluble ferric state, which then precipitates and is removed by the filter media. The media is cleansed of accumulated iron and manganese by periodic backwashing.

CARTRIDGE FILTERS

U.S. Filter satisfies a broad range of cartridge filtration needs through a



contaminated waters. Utilizing black walnut shell media, the filter provides superior clean water throughput and exceptional media cleaning.

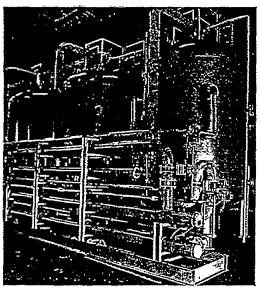
Multi-Media and Dua-Filt filters utilize a bed of multiple graded, granular filter media to remove suspended impurities from water. These units typically contain layers of anthracite, sand, garnet and other media types. Advantages of U.S. Filter's Multi-Media and Dua-Filt filters include higher turbidity loading capacity. high quality water, reduction of water consumption during backwash and reduced capital cost. These filters are available in conventional four, five and multiport valve manifold configurations

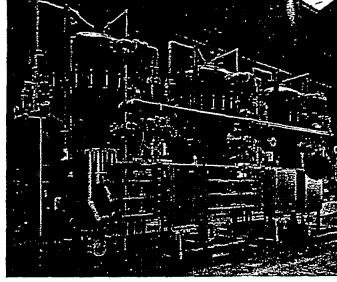
(BELOW) A WIDE VARIETY OF VERTICAL AND HORIZONTAL MULTI-MEDIA FILTERS WITH VARIOUS MEDIA CONFIGURATIONS CAN BE PRECISELY MATCHED TO THE APPLICATION. (RIGHT) AUTO-PULSE TUBULAR BACKPULSE FILTERS ARE DESIGNED TO ACCOMPLISH SUB-MICRON FILTERATION WITHOUT THE USE OF PRECOATS OR FILTER AIDS.

complete line of expendable cartridge filters ranging from 25 micron to 0.1 micron. Filters are available in 10, 20, 30 and 40 inch lengths with both nominal and absolute ratings. Single and multitube housings (sanitary and non-sanitary) are offered with materials of construction including polypropylene, 304 SS, 316 SS and 316L SS.

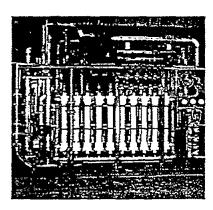
SPECIALTY FILTER SYSTEMS

Specialty filter systems offer unique design features for liquid filtration in a broad spectrum of applications and operating environments.





ULTRAFILIRATION PROVIDES
SUB-MICRON REMOVAL OF
SOLIDS AND LIQUIDS (I.E. OIL).



U.S. Filter's Auto-Pulse tubular backpulse filter combines a proven filter design with modern membrane technology. Without the use of filter aids or precoats. Auto-Pulse is designed to achieve sub-micron filtration.

The ABC Filter is an automatic, back-washable cartridge filter, that offers a cost-saving alternative to replaceable cartridge liquid filtration systems. Utilizing permanent fixed barriet media, this filter regenerates the filter elements through a highly effective, low volume, high turbulence backwashing technique. These filters are especially cost-effective when 2.0 micron removal is required.

U.S. Filter engineers and manufactures Ultrafiltration, Nanofiltration and

AR309387A-200

Solutions Through Teamed Technology

U.S. Filter is the leading manufacturer of filtration, water and wastewater treatment systems for industrial, commercial and municipal uses. Since 1990, U.S. Filter has grown dramatically through the acquisition of many of the industry's leading companies, including IWT, lonpure, Permutit, Lancy, LYCO and MRS (Metro Recovery Systems).

U.S. Filter's objective is to be the single source provider of solutions which meet customers' diverse treatment needs. The company combines over 300 years of collective industry experience, multiple technologies and state-of-the-art manufacturing capabilities to develop integrated, "seamless" solutions. The company is committed to a total solutions approach which can incorporate site review, treatability studies, systems design, equipment manufacture, installation, start-up, training and ongoing field service. U.S. Filter service capabilities also include service deionization and centralized hazardous waste treatment and recovery.

Corporate offices are in Palm Desert, Calif., with manufacturing, processing, sales and service located at over 35 sites in the United States and some 50 locations worldwide.

For Product and Services Information—Call or Write:

United States Filter Corporation 4669 Shepherd Trail PO. Box 560 Rockford, IL 61105-0560

Phone: (800) 333-FILT (3458)

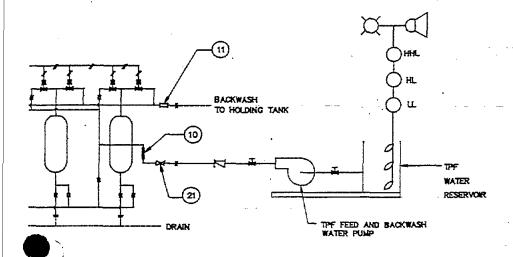
(815) 877-3041

Fax: (815) 877-0172



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	MODEL NUMBER	FLOW G.P.M.	SURFACE AREA (SQ.FT.)	INFLUENT DIAMETER	EFFLUENT DIAMETER	BACKWASH DRAIN DIA.	OVERALL HEIGHT	OVERALL LENGTH	OVERALL WIDTH	PU
		*	12.01 (04.21.7)	DOMETER	DIAMETER		,A	B	C	HLF
	TPF-14-3	16	3.2	1"	1"	1"	7'-0"	9'-4"	3'-0"	1
	TPF-16-3	20	4.2	1 1/2"	1 1/2	1 1/2"	7'-0"	9'-4"	3' - 0	1 2 3 3 5 7
	TPF-21-3	35	7.2	1 1/2*	1 1/2	1 1/2"	7'-0"	9 . —4.	3'-0"	3
	TPF-24-3	50 75	9.4	1 1/2"	1 1/2"	1 1/2"	7*-11** 8*-0*	11'-4"	3'-1" 3'-7"	3.
	TPF-36-3	105	21.2	2"	2	2"	8'-0"	12'-9"	4'-3"	7
	TPF-42-3	150	28.9	2 1/2"	2 1/2	2 1/2"	8'-4"	13'-6"	5'-0"	
ļ <u></u> -,	TPF_48_4	200 265	37.7 50.2	3° 4°	3" 4"	3" 4",	8'-7" 8'-7"	14'0"	5'-6"	10.
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BACKWASH FLOW PER CELL	PER CELL BACKWASH WATER 8 MIN. TIME	SHIPPING WEIGHT INCLUDING MEDIA (LBS.)	OPERATING WEIGHT (LBS.)
1.0 GPM	80 GAL	2,865	3,760
GPM	120 GAL	3,375	4,575
Zo GPM	200 GAL	4,200	5,260
30 GPM	240 GAL	5,085	8,080
50 GPM '	400 GAL	6,570	11,440
70 GPM	560 GAL	8,505	15,245
95 GPM	760 GAL	10,200	18,720
125 GPM	1000 GAL	12,750	21,270
125 GPM	1000 GAL	16,300	31,750



TYPICAL FLOW DIAGRAM

ITEM	QTY.	DESCRIPTION
1	1	TPF CELL.1
2	7	TPF CELL 2
3	1	TPF CELL 3
4	1	N.O. AUTOMATIC VALVE (1F) CELL 1
5	1	N.C. AUTOMATIC VALVE (1B) CELL 1
6	1	N.O. AUTOMATIC VALVE (2F) CELL 2
7	3	N.C. AUTOMATIC VALVE (28) CELL 2
8	1	N.O. AUTOMATIC VALVE (3F) CELL 3
9	1	N.C. AUTOMATIC VALVE (38) CEIL 3
10	1	INFLUENT FLOW INDICATOR
11	1	BACKWASH FLOW CONTROL VALVE .
12	2	PRESSURE GAUGE
13	ī	N.C. AUTOMATIC VALVE (4AV)
14	3	DRAIN (3/4" DIAMETER)
15	3	RAW WATER INLET
16	ĭ	BACKWASH WATER OUTLET
17	t	FILTERED WATER OUTLET
18	1	ELECTRICAL OR PLC CONTROL PANEL
19	ĭ	DIFFERENTIAL PRESSURE SWITCH
20	τ	AIR SOLENOID CONTROL PANEL
21	1	FLOW CONTROL VALVE

NOTES:

PIPING IS SOH BO PVC, SOCKET WELD JOINTS AND TRUE UNION BALL VALVES.

FILTER CELLS ARE FIBERGLASS REINFORCED POLYESTER FILAMENT WOUND TANKS TESTED FOR 150 PSIG INTERNAL PRESSURE AND 120° F OPERATING TEMPERATURE.

THE FEED AND BACKWASH WATER PUMP CENTRIFUGAL, CAST RON, 3500 RPM @ 115 TDH. ELECTRICAL REQUIREMENT: CONTROL: 115 V, 1 PH, 60 HZ. POWER: 230/460, 3 PH, 60 HZ (FOR PUMP)

AIR REQUIREMENT: CLEAN DRY, 60 PSIG, 0.5 SCFM.

FILTER MEDIA WILL SHIP SEPARATELY TO BE LOADED IN THE FILTER CELLS AT THE JOBSTE. (SEE INSTRUCTION MANUAL FOR QUANTITIES AND PROCEDURES.)

TPF-48-4 IS NOT PICTORIALLY SHOWN, HOWEVER, A FOURTH CELL WITH APPROPRIATE VALVES AND CONTROLS WILL BE ADOED TO THE SYSTEM.

PRELIMINARY

			1	
ISSUE REM	SION	 	RMT.	DATE

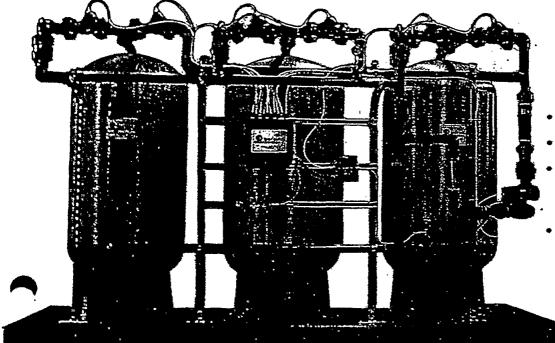
OF GREAT LAKES ENVIRONMENTAL NC.

E CONTINUE SPURMATHER THAT IS PROPRIETARY TO SEEAT LANCE.
TAL. SIC. AND SHOULD BUT SE USED TEXHOUT WINTER PERMISSION XXX

GA. DWG. - TERTIARY POLISHING FILTERS

AR309390

Tertiary Polishing Filter Model TPF



- Skid assembled
- Low cost installation
- Separate backwash water source is not required
- Automatic

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PERFORMANCE

The Model TPF. Tertiary Polishing Filter is a multi-layered media filter to remove 90% or better of all suspended solids. Selected grades of media are installed to achieve solids entrainment and/or surface filtration to produce clean water for discharge or reuse. Media selection can be tailored for removal of 5 to 20 micron sized particles.

OPERATION

Multiple filter cells are mounted on a heavy-duty skid with all cells installed, plumbed and wired. The filtration process is automatic with waste water being pumped from a reservoir through all the filter cells in parallel. Captured solids are backwashed, one cell at a time per operator initiation, differential pressure or on a timed basis.

Raw waste water is used for backwash. Waste water is filtered through two of the cells and diverted to backwash the remaining cell. All cells are backwashed in sequence. The filtration process is not stopped during the backwash cycle. A separate backwash water reservoir is not needed.

APPLICATIONS

- Cooling water
- Clarifier overflow
- DAF effluent
- ☐ Iron precipitate
- 🔲 Pre-carbon polish

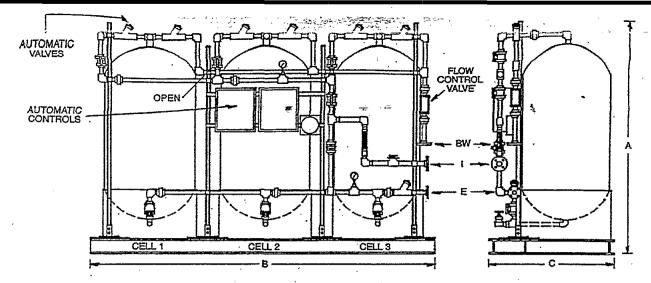
FEATURES

- Corrosion resistant fiberglass
- PVC piping
- · Single skid assembly
- Automatic operation
- PLC controlled (option)
- · Flow indicator
- · Backwash flow control
- · Differential pressure switch

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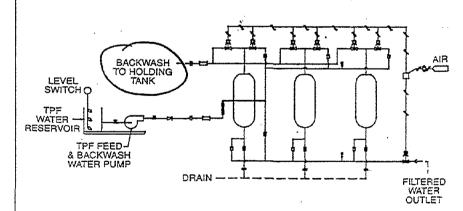


DIMENSIONS WEIGHTS & CAPACITIES

MODEL NUMBER	FLOW G.P.M.	SURFACE AREA (SQ.FT.)	INFLUENT(I) EFFLUENT(E) BACKWASH(BW) NOZZLE DIA.	OVERALL HEIGHT (A)	OVERALL LENGTH (B)	OVERALL WIDTH (C)	SHIPPING WEIGHT INCLUDING MEDIA (LBS.)	OPERATING WEIGHT (LBS.)
TPF-14-3	16	3.2	1.0"	7'-0"	9'-4"	3′-0″	2,865	3,760
TPF-16-3	20	4.2	1.5"	7'-0"	9'-4"	3'-0"	3,375	4,575
TPF-21-3	35	7.2	1.5"	7'-0"	9'-4"	3'-0"	4,200	6,260
TPF-24-3	50	9.4	1.5"	7'-11"	11'-4"	3'-1"	5,085	8,080
TPF-30-3	75	14.7	2.0"	8'-0"	11'-4"	3'-7"	6,570	11,440
TPF-36-3	105	21.2	2.0"	8'-0"	12'-9"	4'-3"	8,505	15,245
TPF-42-3	150	28.9	2.5"	8'-4"	13'-6"	5'-0"	10,200	18,720
TPF-48-3	200	37.7	3.0"	8'-7"	14'-0"	5'-6"	12,750	21,270
TPF-48-4	265	50.2	4.0"	8′-7″	18'-10"	5'-6"	16,300	31,750

Model Number indicates cell diameter—# of cells.
Dimensions are approximate and are not to be used for construction.

TYPICAL ARRANGEMENT



Great Lakes Environmental, Inc.

manufactures complimentary equipment to provide a complete, integrated industrial, waste water ground water treatment system.

Inclined Plate Clarifier
Dissolved Air Flotation
Sludge Dewatering
Chemical Treatment
Instrumentation, Controls, PLC
Carbon Absorption
Oil Absorption
Oil-Water Separators



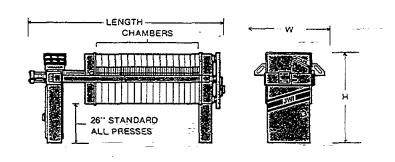
463 Vista • Addison, IL 60101 • 708-543-9444 FAX 708-543-1169

J-Press® Liquid/Solids Filtration and Separation Equipment

Specification/Selection Charts:

The following formula is for establishing J-Press volume (ft³) for most dewatering applications: Total volume of % solids concentration 8.34 lbs. specific gravity product feed of product feed (lbs. per gallon x dry Filter of feed slurry (galions) of water) (see*) solids **Press Volume** Density of wet % dry solids content cake density (ft³) - filter cake X of filter cake x % cake solids (lbs/ft3) (see*) Density of wet filter cake = Specific gravity of wet filter cake x the density of water For filtration applications where feed solids are less than 1%, the filtraapplications, contact JWI for size recommendations. Also, for advice tion area often is the controlling parameter rather than volume. For such on sizing for any application, contact JWI or our representative. Model Size/Capacity (for 114", 32MM thick cake only - other thicknesses available) Filter Press Volume (ft3) Most common capacities others available 6 | 8 | 10 | 12 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 75 | 100 | 150 | 200 470MM Length (In.)** 18" x 18" plates Chambers W 29* H 451/2" 630MM Length (In.) 25" x 25" plates Chambers W 37" H 51%" 800MM Length (In.) 31" x 31" plates Chambers W 431/2* H 581/2" 1000MM Length (In.) 40" x 40" plates 19 Chambers W 511/2" H 661/2" 1200MM Length (in.) 48" x 48" plates Chambers W 60" H 741/2" 1500MM Length (In.) 59" x 59" plates Chambers W 71" H 86"

Many other plate types and sizes available.



國 STANDARD SIZES

OPTIONAL

- % concentration should be expressed in decimal form (e.g. 2% = .02)
- dimensions are approximate only and vary with options chosen.

630 MM (24.8") SIZR - J-PRESS SPECIFICATIONS

1

CAKE THICKNESS (Standard):

1.26 inches 32 WM

AREA PER CHANBER:

6.4 square feet

VOLUME PER CHAMBER:

0.3 cubic feet

WIDIH:

37 inches

HEIGHT:

51.5 inches

CLEARANCE (Floor to Plates):

26 inches

CLOSING DEVICE: Double-acting hydraulic cylinder, automated, air/oil hydraulic pump, self-compensating, 31 ton PLATES - Style: Polypropylene, recessed chamber plates, center-feed, four-corner discharge, gasketed

Total Cake Volume - Cubic Feet	н	1.5	2	3	4	2	9	8	10	12	13	15
Number of Chambers	3	2	7	10	13	17	20	2.7	33	40	43	20
Length - "A" Inches (Approx.)	75.5 8	81.0	1.0 84.0 91.0	1	98.0	98.0 107.0 113.5 129.5 143.0	113.5	129.5	143.0	159.5 170.0	170.0	181.5
Shipping Weight - Approx. Ibs.	1,900 2,	ojo	2,100	2,200	2,300	2,100 2,200 2,300 2,400 2,500 2,700 2,900	2,500	2,700	2,900	3,200 3,300	3,300	3,500

GENERAL INFORMATION-FILTER PRESS OPERATION

and some specifics about the Anderson Press in particular:

In the Anderson Press "dirty" water (or sludge) is pumped into the center feed and the filtrate is returned out the four corners. Depending on concentration of "dirty" water and other considerations, pumping can be as high as 100 GPM. Generally a more efficient flow is 20 to 50 GPM. This flow regulation is relatively easy when using an Air Diaphram pump.

During operation the press will "load up" with the solids removed from the "dirty" water. As this begins to develop the load or resistance to the incoming "dirty" water increases and the back pressure increases on the pump. An Air Diaphram pump is ideal as it will continue to pump at 100 PSI forming a very compact filter cake in the press cavities. The Air Diaphram pump will slow down against the back pressure but, this does not harm the pump and it will continue to pump until it literally stops when the press is full.

There are basically three methods of press closure - Air/Hydraulic, Air and Mechanical.

The Anderson Press has a unique mechanical closure system. Twin Acme type screws are driven by a one HP electric motor. The mechanical advantage of the screws allows the one HP motor to exert 50,000 lbs closing pressure on the filter plates. With this positive closing pressure delivered by *twin* screws the plates are closed evenly and prevent any leaking or weeping. Mechanical closure eliminates problems which can arise from dropping air line pressures.

When the plates are completely closed a load sensing cut-off switch stops the motor automatically. This operation is very simple for the operator and allows him to go on to other things after merely flipping the "close" switch.

After the press is full the cleaning (dumping) is also very simple. The operator pushes the "open" switch and the motor reverses backing off the closure mechanism. The operator then separates the plates enabling him to drop the filter cake into the hopper below for removal from site.

ADDITIONAL NOTES RELATIVE TO PRESS OPERATION:

- 1. Most any type of sludge can be pumped through the press as long as solids do not exceed 1/8" diameter. this damages the pump valves and diaphrams.
- 2. It is generally expected solids will be removed to a 20 to 50 PPM in the filtrate.
- 3. Various types of filter media (D.E., Cellulose Fiber etc.) can be used as a precoat on the filter press plates to enhance filter efficiency.

PRESSURE FILTRATION SYSTEMS

E CENGINEERING CORPORATIO

ENGINEERING CORPORATION

SPECIALISTS IN INDUSTRIAL WATER AND WASTE TREATMENT EQUIPMENT

RAINES AND ASSOCIATES

Gien E. Fleharty

AR309397

14243 "S" Štreet Omaha, NE 68137 800-747-72 402-895-63 402-895-53

402-895-63. -- FAX 402-895-53.

CPC Pressure Filtration Systems

Pressure Filter Plates to Meet Your Individual Needs

CPC pressure filters are supplied with plates in various types, sizes, materials and cake thicknesses.

Recessed Chamber Plates

Polypropylene plates are standard in units sized from 18" square to 48" square with cake thicknesses from 1" to 1.57". For larger plates, where plate stability and process efficiency are of maximum concern, CPC standard plates are of a fabricated carbon steel design. These size include 60" square, 70" diameter round and 84" square plates. Cake thicknesses range from 1" to 1.57" in these size plates as well. For special applications, these fabricated plates can be made of stainless steel or other alloys.

Gasketed Plates

For installations such as process plants and water treatment plants, where cleanliness is of utmost importance, drop-tight, caulked-and-gasketed plates can be provided with CPC pressure filters.

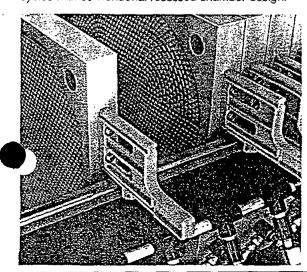
necialty Plates

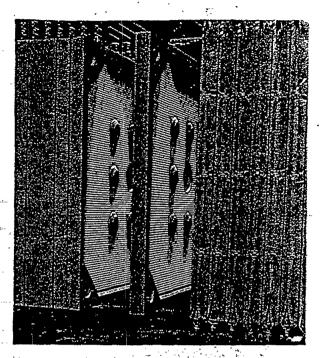
 meet special requirements, fixed chamber plates can be provided in plate-and-frame, open discharge and washing configurations.

Membrane Plates

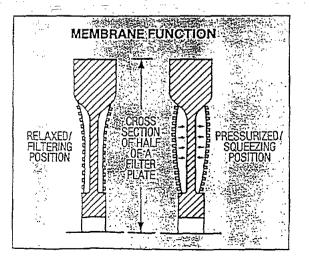
In some applications, such as those requiring long dewatering cycles, extremely dilute slurries, or when pressure filters are used as filtration systems rather than dewatering systems, membrane plates can be a decided advantage.

Membrane plates differ from standard recessed chamber plates in that one or both sides of each pair of plates is covered with a flexible membrane. At 50% to 80% of maximum cake formation, compressed air or water is introduced behind the membrane surface. This provides a mechanical squeezing action on the sludge in the chambers, producing dewatering equivalent to that achieved in longer cycles with conventional recessed chamber design.





	i de la Colonia	CEOURAR	GIEYRER CHAM	BER
PLAIE AND AND AND AND AND AND AND AND AND AND	100 0000000000000000000000000000000000	AND THE	HICKNESS	
	45100 S.		125	157
18" x 18"	0.12	0.15		
25 " x 25"	0.22	·0.27	0.29	0.37
31" x 31"	0.39	0.48	.0.51	0.63
40" x 40"	0.65	0.79	0.84	0.97
48" x 48"	0.86	1.06	1.15	1.48
- 60" x 60"	1.36	1.68	1.80	2.33
70" dia.	2.11	2.50	2.66	3.36
84" x 84"	3.53	4.04	4.28	5.41

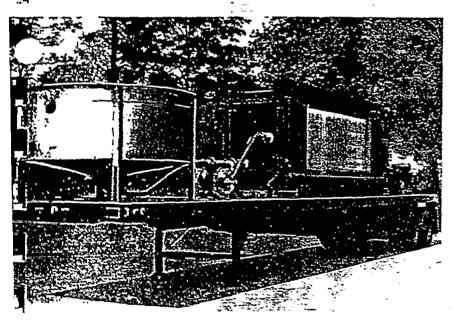


CPC Press Sizes

CPC Engineering Corporation provides one of the broadest product lines in the pressure filter industry, with individual unit capacities from fractional cubic feet to over 750 cubic feet, 100 psi and 225 psi models. Units are equipped with either sidebar or overhead support configurations.

A representative range of CPC models is shown in the chart at the right.

ZMODEL#_	PSI	STANDARD CUBIC FOOT FANGE	STANDARD SOUTH SOUTH STANDARD	FIME USIN	STANDARD : BPLATE SHIFTING	HYDRAULIC CLOSURE OPERATION
1818 SA	100/225	0.3-1.5	6-25	Sidebar	Manual	Manual
2525 SA	100/225	2-10	25-150	Sidebar '	Manual	Manual/Automatic
3131 SA	100/225	6-20	100-400	Sidebar	Manual	Automatic
4040 SA	100/225	25-50	400-800	Sidebar	Automatic	Automatic
4040 OH	100/225	25-50	400-800	Overhead	Automatic	Automatic
4848 SA	100/225	40-100	650-2000	Sidebar	Automatic	Automatic
4848 OH	100/225	40-100	650-2000	Overhead	Automatic	Automatic
70 dia. 0H	225	100-250	2000-5000	Overhead	Automatic	. Automatic
, 8484 OH	225	150-750+	3000-10000	Overhead	Automatic	Automatic



Mobile Unit

Occasionally an infrequent or one-time requirement arises to use a pressure filter at a particular location. To accommodate such a need, CPC Engineering has designed a trailer-mounted, self-contained system that requires only external power and feed connections. Mobile units such as the one shown above producing 50 cu. ft. to 100 cu. ft. of cake are currently in service. Systems with other capacities can be designed as requested

Options

Cake washing!

Used to displace solvents or contaminants when required to product purity.

Plate washers

Manual or automated to reduce down time for periodic cleaning of media.

Acid washing systems

Sometimes required for periodic media/plate cleaning.

Chemical storage/handling systems For use with conditioning systems.

Cake storage/conveying systems For loading of trücks, feeding of incinerators.

Semi-automatic/automatic operation As desired.

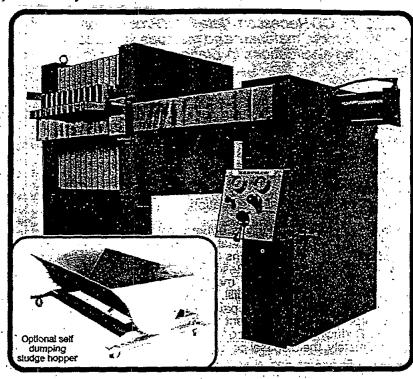


RECESSED PLATE FILTER PRESS

Liquid/solid separation for:

WASTE & SEWAGE TREATMENT BREWING / CEMENT / CERAMIC CHEMICALS / MINING & PLATING INDUSTRIES: / FOOD & VARNISH **PROCESSING**

- MANUAL HYDRAULIC 0.6 to 3 cu.ft.expandable
- SEMI-AUTOMATIC 1 to 50 cu.ft. expandable
- AIR BLOWDOWN MANIFOLD
- CORROSION RESISTANT
- 40-60% SOLIDS CONCENTRATION
- LOW ENERGY REQUIREMENT
- EASY DROPOUT CLEANING



The SERFILCO Filter Press will compact sludges to a dry cake with a density that is not only dependent upon the ultimate compaction pressure, but also the characteristics of the particular sludge. The table below and formula on next page may be utilized to size your press.

% OF CAKE DRY WEIGHT SOLIDS	AVERAGE DRY WEIGHT/ CUBIC FOOT
15-25	15
25-40	25
15-60	30
	DRY WEIGHT SOLIDS 15-25 25-40

Structural steel frame, coated with tough chemical resistant epoxy paint. High density molded polypropylene filter plates are light weight and corrosion resistant. Special polypropylene quick cake release filter cloths. Air actuated hydraulic system for parting and closing the filter plates. Automatic self-compensating hydraulic system. Conveniently located operator control console.

Each pressload will require from 2-4 hours cycle time. To insure adequate time, the press should be sized for at least 8 hours working capacity. For accurate sizing of your filter, contact SERFILCO to arrange a pilot test.

OPTIONAL EQUIPMENT

SLUDGE HOPPER

Self-dumping hoppers to transfer the compacted solids from the press to a large roll-off type container are available. The hoppers, specifically engineered for each class of press, are easily moved with forklift truck and dumping is accomplished merely by a trip handle.

AUTOMATIC PUMP CONTROL

Allows progressively increasing air pressure on diaphragm pump to attain a denser, drier cake.

DRUM DISPOSAL SYSTEM

With extended legs & chute. (The press must be raised to permit adequate clearance for a drum.) this is available on presses up to 5 cubic feet.

PLATE SHIFTER, SAFETY LIGHT CURTAIN, PRESS-FULL INDICATOR and HYDRAULIC INTERLOCK are additional features on some models. Refer to page 136.

H-213. AR309400



EFFICIENT, ECONOMIC

The SERFILCO Recessed Plate Filter Press incorporates modern materials and methods suited to dewatering applications in plating and other industries.

The graph on the right demonstrates the savings possible relative to other sludge dewatering methods. Sludge dewatering and thickening equipment are classified into two basic categories: gravity dewatering equipment, which relies on the difference in size and/or density between the solids and the water to thicken the sludge, and mechanical dewatering devices, which subject the sludge to external forces to affect liquid/solid separation.

Underflow from most clariflers, where metal hydroxides have been precipitated, flocculated, conditioned and allowed to settle, usually contains 99 to 99.5 percent water. With the enactment of the Resource Conservation and Recovery Act (RCRA), these metal hydroxides must be disposed of in a licensed landfill. This involves transportation and disposal costs to be paid by the generator. Both costs depend to a large extent upon the volume of the sludge. Reducing the water content reduces the volume and, ultimately, the disposal costs.

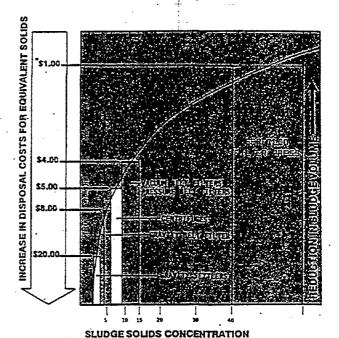
nickening equipment such as gravity settlers and gravity selt filters remove the "free" water, contained in the cavities between the particles producing up to 10% total solids concentration. Removing floc water, water bound to the particles as a result of attraction to polar hydroxide particles, cohesive forces and surface tension, requires mechanical dewatering equipment applying forces stronger than gravity. Filter presses supply the type and amount of force necessary to achieve 25 to 50 percent solids content. The Serflico Recessed Plate Filter Press applies sufficient compaction pressure to compress the sludge and "squeeze out" the water, yielding a dry cake of 25% to 60% total solids concentration in many cases.

The reduction in disposal costs resulting from the decrease in sludge volume amount to as much as a 99% savings. In most cases, the Filter Press pays for itself by reducing sludge disposal costs.

PRESS APPLICATION

GENERAL: The filter press has been utilized for many years to separate liquids from solids. In many cases the liquid is saved, while in other cases, the solids are the desired product. The filter press is an efficient system which provides high pressure filtration and/or compaction and ease of operation. Other filtration systems offer high pressure filtration, but only the filter press has both high pressure capability and efficient filter cake removal.

The filter elements are constructed of light-weight polypro-"ylene. They are extremely corrosion resistant and virtually eliminate plate breakage.



* Assume sludge disposal costs to be \$1.00 per gallon.

HEAVY DUTY CONSTRUCTION

The filter's skeletal framework is completely fabricated of heavy gauge steel. The internal stresses and pressures generated by the hydraulic ram are absorbed by the steel frame. Only the stationary weight of the press is transferred to the support structure. Heavy duty side bars connect the head section to the tail section and support the filter plates.

RECESSED PLATE CHAMBERS

When two recessed plates are held together, a cavity is created between them, thereby eliminating the need for a frame. A filter membrane is stretched across each plate to retain the filter cake.

The cake is not suspended in a frame as in the conventional plate and frame unit and thus is readily discharged when the press is opened. Since the external surfaces of the cavity are now structurally tied together by the plate, the unit can withstand much higher internal filtration pressures.

NON-GASKETED AND GASKETED PLATES

The filter cloth forms the seal between the plates. Latex tracking can be applied to the cloth to limit the leakage of the filtrate. The high internal filtration pressures will, however, force a small quantity of the filtrate from between the plates. Gasketed plates are available which retain valuable filtrate and also prevent leakage.

MANUAL HYDRAULIC

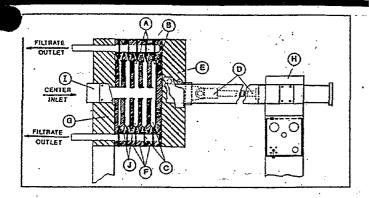
These units are available in the smaller sizes for an economical press without sacrificing solids concentration or press quality.

H-214

#AR309401

DEWATERING OF SLUDGE





OPERATION

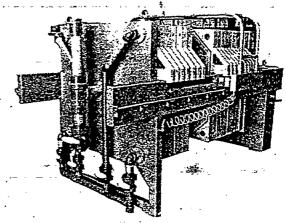
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Dewatering is accomplished by pumping a slurry or sludge into chambers (A) surrounded by filter membranes (B). As pumping pressure is increased the filtrate is forced through the accumulated filter cake (C) and membrane until the chamber is full of solid filter cake.

The chambers are formed by two recessed plates held together under hydraulic pressure. The hydraulic ram (D) moves the follower (E) against the stack of filter plates (F) closing the press. The ram continues to apply sealing pressure of sufficient force to counteract the high internal compaction pressures. The head stock (G) and tail stock (H) are held in place by specifically engineered side rail support bars (I).

The filtrate passes through the membrane and is directed by channels in the plates and drain ports (J) to the head stock for discharge. The filtrate typically contains less than 15 PPM suspended solids. The filter cake is easily removed by simply reversing the hydraulic ram, thus opening the press. The lightweight plates may then be moved apart, permitting the compacted cake to fall from the chambers.

The higher the internal pressure, the greater the solids compaction. The standard SERFILCO press is constructed to withstand 130 PSI compaction pressure producing a hard dry cake. The special high pressure press can withstand 225 PSI for sludge more difficult to dewater.



Air diaphragm type pumps provide very efficient compaction of the sludge. The maximum pressure may be set with the air supply regulator and the pumping rate set with the volume of air flow. The pump will run rather rapidly during the initial phase of the cycle, slowing steadily as the back pressure increases, due to cake formation. Low initial back pressure induces rapid pumping and shortens the overall cycle time. When the pump attains the desired pressure, and the flow rate slows the compaction cycle is complete. Air blowdown manifold allows influent to be purged from piping before press is opened.

The overall cycle time is dependent upon the concentration of the inlet sludge. Higher concentrations dramatically reduce the cycle time. Typical cycle time is one to four hours. Typical cleaning time is less than 30 seconds per plate.

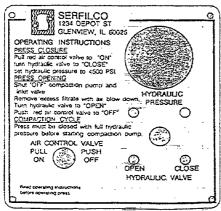
SEMI-AUTOMATIC OPERATION

The follower is moved into the operating or pressure position and back to the cleaning position with a heavy duty air powered hydraulic ram. This self-compensating hydraulic system prevents over pressurization and automatically prevents loss of closure pressure from thermal expansion/contraction of the polypropylene filter chambers. All components are mounted inside the tail stock. A check valve prohibits loss of hydraulic pressure if air pressure is lost. Manual hydraulic models use a hand jack.

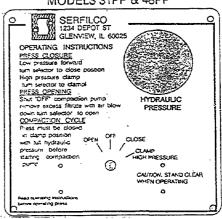
CONTROL CONSOLE FOR SEMI-AUTOMATIC

One convenient control console houses all air and hydraulic controls. The compact console contains the off/on switch, press opening/closing control lever, and hydraulic pressure gauge.

MODELS 24PP



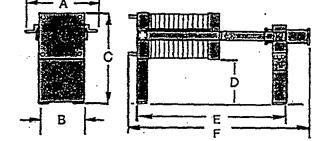
MODELS 31PP & 48PP



CALCULATIONS:

A (U.S. GALS./8 HRS.) X B (% SUSPENDED SOLIDS) X 8.33 LBS./GAL = CU. FT. CAPACITY FOR A DURATION C (AVERAGE LBS. DRY WT./CUBIC FT.)

- A. Total gallons processed within desired filter press volume, 8 hours in this case. Twenty-four hours may be used to insure adequate capacity.
- B. Percent by weight of filterable suspended solids.
- C. Pounds per cubic foot for a particular sludge obtained from table.



TO ORDER:

MANUAL HYDRAULIC

ഗരാജ്യ	CUBIC	PRICE CODE	NUMBER
	FEET	NON-GASKETED	GASKETED
TE-BENTH	0.6	43-0804	43-0804G
HEPPME	1.0	43-0805	43-0805G
Self Boldie	2.0	43-0806	43-0806G
SHERBYE	3.0.	- 43-0807	43-0807G

IN-OUT	• ' 、 .	D	MENS	ONS (I	N.)		APROX.
NPT AND SQ. PLATE SIZE	A ·	В	С	D	E	F	WEIGHT (LBS.)
14657.11 (8167010)	32 0	72.	(9)		す。 恵 天	% 6 7 67	366 350 346 960

SEMI-AUTOMATIC

521PP	1	43-0601	43-0601G
20/4 EP	2	43-0602	43-0602G
32(22	3	43-0603	43-0603G
442122	4	43-0604A	43-0604AG
523PP	5_	43-0605A	43-0605AG
651PP	6	43-0606	43-0606G
30122	8	43-0608	43-0608G
10-31 RP	10	43-0610	43-0610G
्राइडाइ न	15	43-0615A	43-0615AG
6 20-3 IPP	20	43-0620A	. 43-0620AG
\$25-48PP	25	43-0625A	43-0625AG
#\$30-48PP	30	43-0630A	43-0630AG
40-48PP	40	43-0640	43-0640G
50-48PP	50	43-0650	43-0650G
** 3 de	- W. *O	to Model Number w	non maskatad

** Add suffix "G"	to Model	Number	when	gasketed
	model is	ordered.		

					57 67	84	1700
2-1/2" x 1-1/2"	39	31	56	30	67 74	93 100	1900
24 (630 mm)	~	J.	00	00	80	107	2
(000)					89	116	2300
10 March 19		2		100	382	3.09	4200
					92	719	4250
Stratific	348	S0	: 83 I	#30 #	102	193	7 <u>900</u> 0
312 (800 mm))					127=	8154	350°C
	***	法是			1524	179	\$600G
					105	133	11,380
3" x 2"	66	58	86	35	116	144	11,850
48" (1225 mm)		•			141	169	13,100
					163	191	14,400

NOTE: Air blowdown connections is 1/2" NPT on all models.

OPTIONAL

DESCRIPTION	PRICE CODE NOS.							
Air diaphragm pump, 1/2	55-7120A							
Polypropylene w/nitrile 1	- 40 GPM	55-7144A						
See Bullstin P-605 2	' - 135 GPM	55-7004B						
Drum disposal system w/exter & carbon steel chute for 1 to Manual	43-0667							
	Semi-automatic 24"							
Self-dumping sludge hopper	6 cu. ft.	43-0641						
(Order 2X press capacity)	10 cu. ft.	43-0642						
	20 cu. ft.	43-0644						
	30 cu. ft.	43-0649						
PRESS-FULL indicator	43-0668							

Consult factory for options not shown, such as high pressure units, catwalks, drum carts, etc.

F.O.B. Houston, Texas

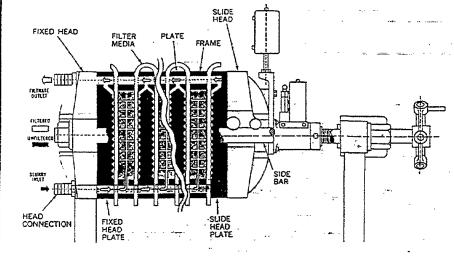
DESCRIPTION	PRI	CE COD	E NUMBE	ERS
FOR PLATE SIZE	18*	24"	31"	48*
Pneu, plate spreader		43-0680	43-0656	43-0658
Safety light curtains	-	-	43-0659	43-056
Replacement cloth Non-gasketed Gasketed	SF-U18 <u>*</u> SF-U18 <u>*</u> G	SF-U24 <u>*</u> SF-U24 <u>*</u> G	SF-U31 <u>*</u> SF-U31 <u>*</u> G	SF-U48] SF-U 8*
Expander piece (For the future addition of up to 10 plates) Additional plates (each)	43-0672 43-0676	43-0673 43-0677	43-0674 43-0678	43-057: 43-067:
Automatic pump control 3 stage 4 stage		_)662)670	
Hydraulic Interlock for feed pump air supply		43-0	X671	•

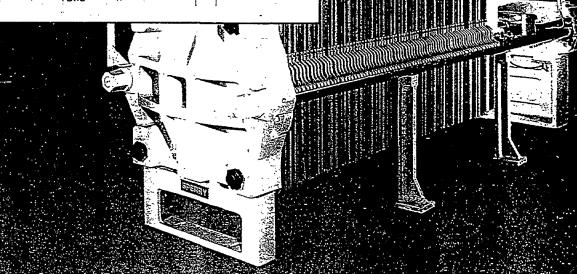
* To designate cloth position add to Price Code Number: H Head T Tail M Intermediate

The Sperry Filter Press Process

In simplest terms, the primary application of a filter press is to separate solids from liquids. The product to be gained from the filtration process can be the liquid or filtrate (as in fabric processing), the solid or cake (as it

metal hydroxide removal), or both (as in distiller applications). Regardless of application, a Sperry Filter Presses are designed with three essential customer objectives in mind: . To mee filtration requirements • To minimize capita investment costs • To minimize operating costs





Design Considerations

In every filtration application there are six basic design factors which need to be considered and optimized in order to achieve the most efficient process operation. These factors are:

- Size of press Type of skeleton
- · Number of filtration chambers
- · Configuration of plates · Filter media · Shifter mechanism/closing devices

D.R. Sperry's research and laboratory facilities are used to test appli-AR309404 cations beforehand and insure the optimum design of the finished filter press. 🚌 🗈

Flexibility, Performance, And Economy

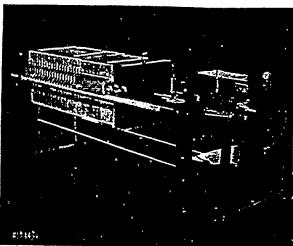
naggara was

The Speriy Filter Press is useful in virtually limitless applications whether filtrate or cake or both are desired; whether the filtered material is free-flowing or viscous, or whether it's hot or cold (40°F-400 - F); whether temperature control is critical or non-essential; whatever filter media is required. If you have a filtration application, D.R. Sperry can build a filter press to meet your requirements.

Years of experience in thousands of industrial environments have given Sperry the expertise to give you the maximum filtrate clarity, the dries cake - and to achieve these fo you at the lowest possible cost. Or understanding of how design factors are interrelated enable us t maximize press efficiency, whic means not only capital and operating savings, but means our presses las

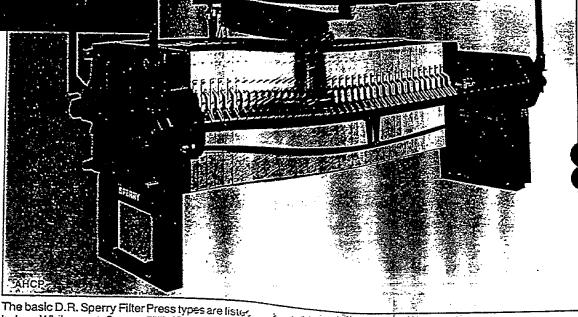
Sperry metalcasting expertise pouring cast gray and ductile irc gives you the benefits of highe strength than fabricated materia and no possibility of weld frag tures. The bottom line is that th average field life of a Sperry Filte Press is thirty to forty years! (Ar this average includes our mo recently shipped presses.)

Sperry Filter



Filter press sage (1) They contain the cknowledge (2) They formally the cknowledge (3) They filter elements, and 3) They contain the ckrone in the intrauous process. They support the filter elements, and 3) They provide the metal, feet the support the fifter elements for cleaning.

With these purposes application and state of the Press skeletons are based on customer application and standard and seconomies.



below. While most Sperry Filter Presses are o these types, they do not represent the Larverse o Sperry Filter Presses. Sperry filtration engineer pride themselves on special applications, and have established their reputation on being able v. design a product to meet any filtration need regardless of how obscure or esoters. Sperv. Filter Presses are available in sizes ranging from

D.R. Sperry Filter Press Type EHCL

EHCL-type presses feature an electric motor driven double-acting hydraulic cylinder closing mechanism equipped with a locking device. Used for automatic opening and closing of the filter elements, EHCL-type filter presses are generally used in applications with long filtration cycles. The locking device insures that the press will not fail due to extended system pressure.

D.R. Sperifiliter Press Type Arris

AHCP-type previous feature a couble-active prices a cylinder which provide countries closing pressure a zer, the fill often cycle. They are gravally used in applisations reasest shipmen filtration 8/10 hours

D.R. Sperry Filter Press Type HHC

HHC-type filter presses feature manually-operated hydraulicallyclosed closing devices with a lock ing mechanism. HHC-type filte presses are generally used in fiftration applications requiring long cycles and manual operation. HHCtype presses are less expensive than other types of filter presses.

AR309405

196 standard Sperry Filter Press is

designed for operation at up to 500

dissigned to operation at specification and sidebar presses are designed to 150 psi. The important point is presses are designed to specifications.

withing operating parameters — per-

and quality are built in from the

Transition of the finished press.

Sperry Filter Press Plates

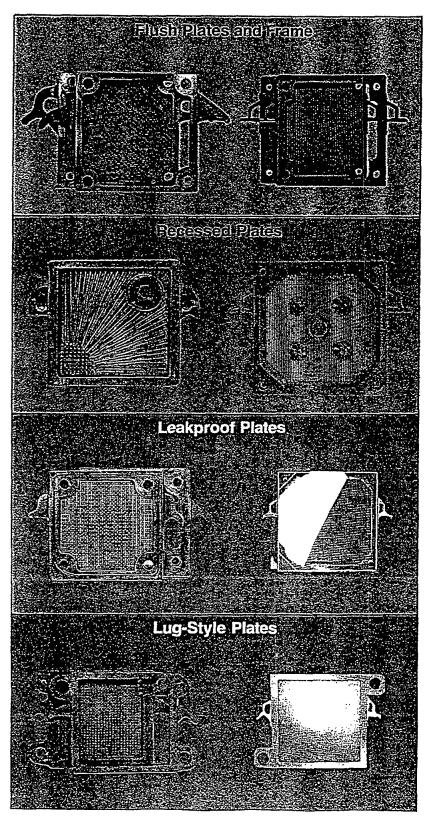


Plate configuration — the selection of the correct filter element - is absolutely critical to filtration applications. Among determinant factors in plate configuration are cake thickness and filtration area, the temperature of the filtrate, the need (or lack of need) for temperature control, volatility of the filtrate, viscosity, and so on. The particular combination of these factors in any application will determine compatible materials of construction. Cost is also a consideration here. The multiplicity of factors inherent in any application makes flexibility of plate construction material a real advantage to anyone designing a filtration system.

There are two basic blate styles. flush plate/frame and recessed plate, and these in turn have specialized styles of their own. Generally, when the central application is clarification of the filtrate, flush plate and frame is the configuration of choice; when the cake is the desired end-product recessed plate configuration is generally used in the filter press. A special type of flush plate and frame is the lug style plate. Lug style plates are used when the application demands frequent changes of filter media (e.g. the processing of shellac), and minimize labor in that they eliminate problems of media alignment.

Leakproof plates are a special gasketed type of recessed plate. Imperative in the filtration of volatile or hazardous materials, they are often used to reduce product loss or simply to effect a cleaner environment.

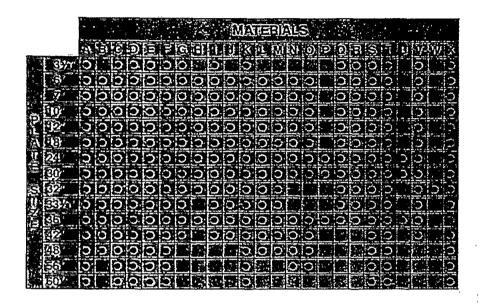
All D.R. Sperry Plates can be adapted to all D.R. Sperry Filter Press Skeletons. This affords the engineer a range of filter press configurations exceeding that of any other filter press manufacturer.

The Critical Design Advantage Provided By D.R. Sperry

Filter Plate Flexibility Beyond Polypropelene

D.R. Sperry offers the widest range of filter plate materials in the industry.

PLATE & FRAME

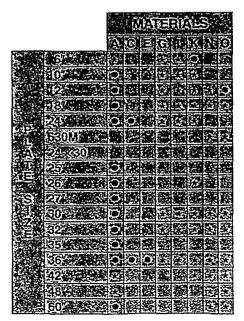


RECESSED AND LEAKPROOF

(*INDICATES LEAKPROOF AS WELL AS RECESSED)

LUG-STYLE

			· N	IAI	ĖR	AL	S	
		Α	Ğ	113	įN	Ö,	Τ	Ÿ
P	6"	, 1	• 3		減	落		
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	48*	•	7.5	17.	3	*	•	



Available Materials

Listed below are the materials from which D.R. Sperry manufactures filter press plates. The charts at the bottom of this page indicate current Sperry plate patterns by plate style. material, and size of filtration area. These charts reflect standard Sperry plates and do not include special plates which Sperry can produce and which may be indicated for your application.

A=Cast Iron

B=Cast Iron (steam-heated)

C = Cast Iron-Heresite® coa

D=Cast Iron-galvanized

E=Cast Iron-lithcote

F=Cast Iron-nickel coated

G=304 Stainless

H=304 Stainless (steam-heated)

I=316 Stainless

J=316 Stainless (steam-heated)

K=Aluminum

L = Aluminum (steam-heated)

M = Aluminum (steam-heated)

Teflon® coated

N = Polypropelene

O=10% glass-filled Polypropelene

P=Hi-temp glass-filled Polypropelene

Q=Hastelloy's B (heat-treated)

R=Hastelloy: C

S=Ductile Iron

T≈NI Resist

U=Kynar® PVDF

V ≈ Bronze

W = Nickel Iron

X = CI-Firmacoat

7. Sperry & Co.

and their intertions processings their species is opened to their grant finish



Founday

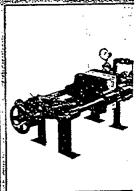


: : : Machine Shop)



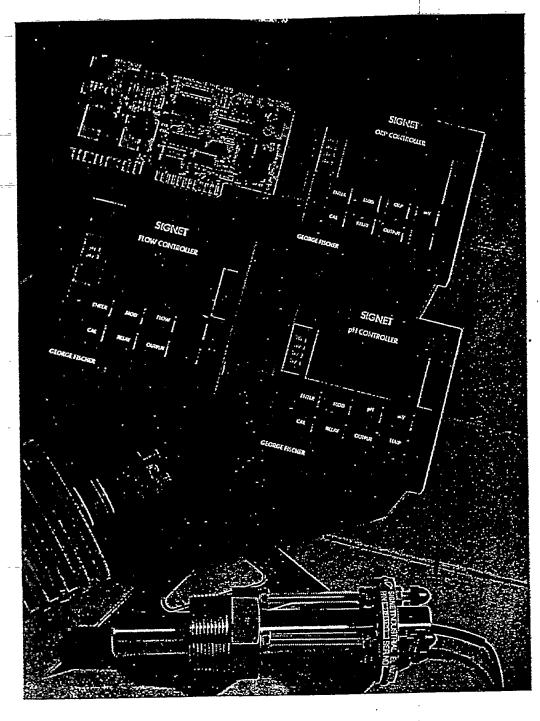


Laboratory

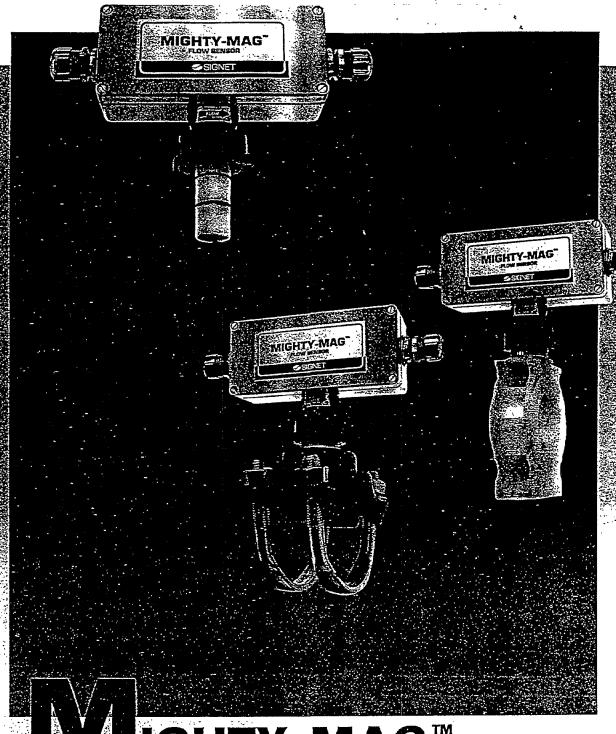


Rental Equipment D.R.Sperry stocks an inven-rental equipment for on site to

SIGNET Flow Instrumentation



GEORGE FISCHER +GF+



I GHTY-MAG™

FLOW SENSORS

The Lightweight, Low-Cost Alternative To Full-Line Mags

GNET WIGHTY-WAG

Most off-line maps make installation and increase increase and learn and installation explicitly one carbon are minutes and installation explices only one carbon are minutes packed into miscompact middelocessor, based units

COSTS XEPT ATAMINIMUM.

The MIGHTP MAG Costs less to buy and less to maintain than competitive units youll save hundreds of dollars over fulfalline mags—which increase substantially in price as pipe size increases (MIGHTP MAG increases only lightly no appears on And the Mix 56's three sizes adapt to pipes from 1/2 to 1/2 inches and dameter (Maintenance costs are lower to 5 fice the sensor can be removed in seconds to cyntime is reduced and can be eliminated altogether by adding an Mix 319 Wetstap Assembly Plus.

MIGHTY MAG power consumption is half that of conventional full-line mags.

SIMPLICITY OF OPERATION

A simple principle governs the MIGHTY-MAG's operation.

A simple principle governs the MIGHTY-MAG's operation. Voltage proportional to your flow velocity is generated through the magnetic field provided by the sensor. With the

MIGHTY-MAG self-restoring, alternating pulsed DC magnetic field is achieved. The result of this technique is Improved signalto-noise ratio.

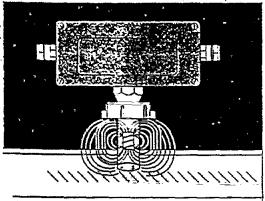


Because there are no moving parts to foul, the MIGHTY-MAG easily handles liquids with up to 30% suspended solids. With minimal head loss. And since it is made of PVDF, you can use it in a wide range of general applications. Typical applications include:

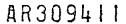
- Clay Green liquor Starch. Sodium Hydroxide

- Industrial waste water. Municipal waste water

 - Carbonated Beverages Fruit & Vegetable Juices Vinegar









REGROOFWOR

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j				S Billies	37.30		- 26				

MK 30655 NS PV PVDF SEINES SES = 05 1975 MK 30955-VE PVDF IPVDF SEINES SES 5-8 605 16.001	ii Vo	W. 4 . 7 .							 	 _	 		 				
	3 (9 fa		100		 				 ==	 	 			ic	00		

MIGHTY-MAG SPECFICATIONS

Output Signals:

4-20 mA linear into 600 Ω max, load 0-20 mÅ linear into 600 Ω max. load 0-2 VDC linear into 200 Ω min. load 0 to 135 Hz, 5V Square Wave (50% Dury Cycle)

(Outputs can be isolated)
5. Microminos
0.5 to 20 tps
±1% to full scale

Minimum Conductivity: Flow Rate Range: Linearity:

Accuracy: After initial calibration, ±1% of full scale at 25°C, plus a temperature coefficient of 0.05%/°C. Note: Min.

Batch size = 2 minutes 30% of fluid volume Maximum % Solids:

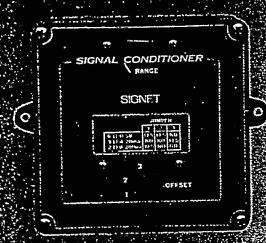
isolated operation.

Power Requirements:

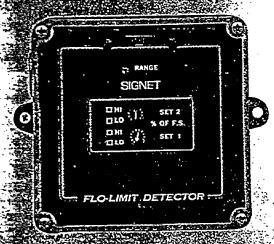
13 to 18 VDC at 850 mA max. (MK 300:75 Power Supply included) Additional power supply (11 to 17 VDC at 30 mA max.) required to

When your application calls for acid transport, order a PVDF MIGHTY-MAG sensor with matched Signet installation fitting. For use in ½ to 8 inch pipe sizes.

CONDITIONERS/DRIVERS



ECECO OF WOL



HOWATO ORDER

MK 514

SIGNAL CONDITIONER

CHAL COMPILE (MERCE EPRONITY TO A VICE VALETY OF EXECUTED ENDIENT SIGNAL AND ALL SIGNAL OUTPUT FOR YOUR SIGNAL OUTPUT FOR YOUR SIGNAL OUTPUT FOR HOW THERE IS AN ALL SIGNAL OUTPUT IN A PROPERTY OF THE COMPANIES HERE AND A PROPERTY OF THE COMPANIES HERE AND A PROPERTY OF THE COMPANIES HERE AND A PROPERTY OF THE COMPANIES HERE AND A PROPERTY OF THE COMPANIES AND A PROPERTY OF THE CO

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- Monther of the Mark. In 195 ma. Monther by Monther spins, as mighted 25 MCC.
- DO DE SE SEC. THE VAC. SEE VAL a dinenes spiero, 235 maies de

MK 511 FLOLIMIT DETECTOR

To sound an audible alarm, activate around of control external equipment as your flow attemption of exceeds pre-set limits in ely on the WK sixt sould be channel Flolimit Detector. Set your upper and lower flow rate limits on the WK sixt with a set point variable of 10% to 100% of full scale and Failsafe relay logic ensures this instuments reliability in the most critical fittid control applications. Two SPDT relays are activated when the flow rate is safe. They deadly are when the flow rate is soo high or too low. A FRE oulse output less you interface with your data acquisiton equipment. you interface with your date or other Signet instruments

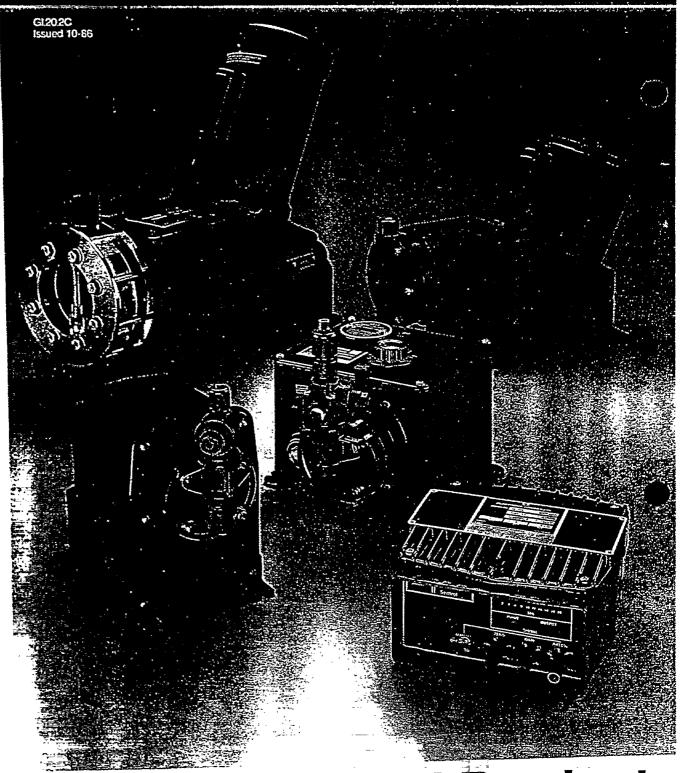
MK 3700 pH/ORP TRANSMITTER

Signes a server reserved of the server of th

The key parformance traine of the MK 3700 is the solution of the phi input, so the expension of the phi input, so the exit may be take calibrated to represent the expension of present the expension of present the expension of present the expension of the expens

The replaceable combination sensor provides easy residiation and malmerance. A double program repeated in the replacement of the replacement of the replacement of the replacement of the replacement of the replacement of the repeated of the replacement of the report of

Power	16-so yec (21V nominal));	Temperature range \$ 0, to 100°C
Current (loop load resistance	700 ohms @ 24 VDC : (1997)	Junction type Annular double junction of porous Teflon® materials
Output	dsolated 4-20 mAx	See Temperature compensation Automatic from 0 to 100℃
	ac(includes sensor) E1967FS Exnominal Research	Materials of construction Polypropylene with Viton O-rings
Ambient temperature (0.to 509G	Omenical Avion
Ambient temperature effect	66 = 0197/90 #85# #2	P/N Description 3 8700 101 12 5 pH y ransmitter, all purpose, Teflon reference
Relative humidity 2003	0 to 100% (non-condensing)	3:8700:101:32 pH-Transmitter, all purpose, HDPE reference
SENSOR SPECIFICATION		3-8701 01 CFP Transmitter with platinum electrode 5-3-2700 391 Submersion Adapter Kit requires special coax
Pressure rating:	i00 osig @25 G maximum Gerated to 25 osig @ 100 C	cable between sensor and junction box length depends on submersion depth 3-2700/261-XX pH/Submersion Cable, 1-12 ft. (specify length)
Response time	10 seconds for 98% of pH step change @constant temperatur	ph. Submersion Cable, 1-12 it. (specify length) (S-2701/261) XX — ORP Submersion Cable, 1-12 it. (specify length)

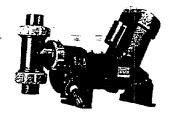


Precision Control Products
By CHEM-TECH INTERNATIONAL Inc.

Metering Pumps

H1000-H4000 | Series

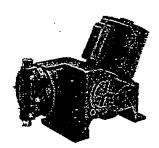




Heavy-Duty Mechanical **Metering Pumps**

		Out	put	Max.		Connections				
Ser	ies	Max GPH*	Min GPH*	PSI	Fittings	Head	Valve Balls	"0" Rings	Diaton® (Diaphragm)	Connections
H1000	-121	5.6	.56	600	PVC	Acrylic	Ceramic	Viton	Hypalon	1/4" NPT
	-141	11.2	1.1	600	316 S/S	316 S/S	316 S/S	Teflon	пураюн	74 NPT
H2000	-121	8.8	.88.		PVC	Acrylic	· Ceramic	Viton	Hypaion	
	-141	17.6	1.8	400	316 S/S	PVC 316 S/S	316 S/S	Teflon	Teflon	14" NPT
H3000	-121	30	3			Acrylic				
1	-141	60	6		PVC	PVC	Ceramic	Viton	Himpian	%" O.D. Tube
	-161	90	9	150	Polypropylene 316 S/S	GFP Cast Iron 316 S/S	316 S/S Teflon	Teflon	Hypalon Teflon	1⁄2" NPT
H4000	-121	110	11	50	5)/0	DVO	PVC	Hypalon	Hypalon	/ 1/4 NOT
j	-141	220	22	35	PVC	PVC	Flappers	Viton	Teflon	11/2" NPT

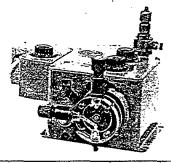
M5000 Series



Heavy-Duty, Medium Capacity Metering Pumps

		Our	tput	Max.		Wetted Parts Materials of Construction				
Sei	ries	Max GPH*	Min GPH*	PSI	Fittings	Head	Valve Balls	"0" Rings	Diaton® (Diaphragm)	Connections
M5000	-121	7.5	.75	-150		Acrylic				***************************************
	-141	15	1.5	-150	PVC	PVC	Ceramic	Hypalon	Hypalon	½" O.D. Tube
	-1R1	7.5	.75	050	Polypropylene .	GFP	316 S/S	Viton	Viton	1/4" NPT
	-1P1	15	1.5	250	316 S/S	Cast Iron	Teflon	Teflon	Teflon	1/2" NPT
•	-1H1	25	2.5 =	100	1	316 S/S				

6000 **Series**



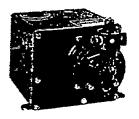
Compact Mechanical Slurry Feeder

	•	Ou	tput	Max.		Wetted Parts Materials of Construction				
Ser	ries	Max GPH*	Min GPH*	PSI	Fittings	Head	Valve . Balls	"0" Rings	Diaton* (Diaphragm)	Connections
6000	-11F	2.5	.25	60	PVC	مريانه	Coromio	Hypalon	Hypalon	ነ⁄ታ" O.D. Tube
	-21F	5.0	.5	60	PVC	Acrylic	Ceramic	Libration	пураюн	™ O.O. lube

^{*}Based on 60Hz current at maximum rated pressure.

Duplex models available.
Standard model pumps are 115V, 60Hz, other voltages and 50Hz versions available on request.

8000-9000 **Series**





Compact Mechanical Chemical Metering Pumps

		Output		Max.			Connections			
Sei	ries	Max GPH*	Min GPH*	PSI	Fittings	Head	Valve Balls	"0" Rings	Diaton® (Diaphragm)	Connections
8000	-11-	.83	.17	100		Annatin		Liverier	Urmalan	
	-21	1.6	.32	60	PVC	Acrylic	Ceramic	Hypalon	Hypaion	⁵⁄is" O.D. Tube
	-31	1.4	.28	150	316 S/S	PVC	316 S/S	Viton Teflon	Viton Teflon	1/4" NPT
	-41	.35	.07	250]	316 S/S	1	lenon	leilon	
9000	-11	2.5	.25	125	PVC	Acrylic	Commission	Umalaa	1.11	
	-21	5.0	.5	75	GFP 316 S/S	PVC GFP 316 S/S	Ceramic 316 S/S Teflon	Hypalon Viton Teflon	Hypalon Viton Teflon	1/2" O.D. Tube 1/4" NPT

10000P-11000P Series

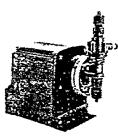


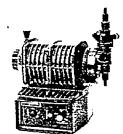


Solid-State Electronic **Chemical Metering Pumps**

		Out	tput	Max.		Wette Materials of	d Parts Construct	ion		C
Ser	ies	Max GPH*	Min GPH*	PSI	Fittings	Head	Valve Balls	"0" Rings	Diaton® (Diaphragm)	Connections
10000	-01P	.14	.004	75		Acrylic				
		.57	.018	75	PVC	PVC	Ceramic	Hypaion	Hypalon	5/16" O.D. Tube
	-11P	1.0	.03	45	GFP	GFP	316 S/S	Viton	Viton	W" NPT
11000	440	1.2	.018	125	316 S/S	Polypropylene	310 3/3	Teflon	Teflon†	74 141-1
	-11P	2.2	.012	80	1	303 S/S		ļ		

12000-14000 Series







Solid-State **Electronic Chemica Metering Pumps**

		Ou	tput	Max.			Connections			
Sei	les -	Max GPH*	Min GPH*	PSI	Fittings	Head	Valve Balls	"0" Rings	Diaton (Diaphragm)	Connections
12000	-11P	2.2	.012	80		Acrylic .	1			
12000	-11PHO	5.5	.2	35	₽VC	PVC	Ceramic	Hypalon	Hypalon	₩ O.D. Tube
13000	-11	2.0	.012	150	GFP	GFP	316 S/S	Viton	Viton	14" NPT
13000	-11HO	5.0	.016	90	316 S/S	316 S/S 303 S/S	Teflon	Tellon	Teilon f	i i i i i i i i i i i i i i i i i i i
14000	~ 111	10	.042	35	PVC 316 S/S	Acrylic PVC Cast Iron 315 S/S	Ceramic 316 S/S Teflon	Hypalon Viton Tellon	Hypalon Viton Tellon	'A" O.D. Tube ∴∴ NPT

^{*}Based on 60Hz, current at maximum rated pressure.

Duplex models available.

Standard model pumps are 115V, 60Hz., other voltages and 50Hz, versions available on request.

†Pressure rating reduced with Teffon Diaton; consult factory.

FLOWMETERS For Automatic

Pump Pacing

Thermoplastics in the internal mechanism eliminate corrosion problems.

200 Series Flowmeter

Measuring range of nearly 100:1 with ±2% accuracy or 22:1 with ±1% accuracy.

Magnetic drive eliminates leaks and packing glands.

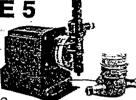
Magnetically operated reed switch design.



 Automatic pump pacing by switch closures.

Stroke frequency directly proportional to the number of switch closures.

Can be provided on any of the electronic pumps with a built-in control circuit, and for large mechanical pumps which use a separate control box and electromagnetic clutch.



Control Code 5

MODEL 5 pH Proportional pH **Pump Controller**

 Complete with probe and available in 115v or 220v.

Combines the functions of pH probe, analyzer, inverse and direct controller in one unit.

Pumping rates are directly proportional to the pH deviation from a preselected set point.

Output rates adjustable below or above controller set point.

Units available for either mechanical or electronic pumps.

SENTROL® 9 **Automatically Controlled Metering Pumps**

 Solid-state electronic design for proportional feed

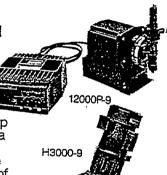
system applications.

• Automatically paces the pump stroking rate in proportion to a

current input signal.
Instantaneously allows for the injection of precise amounts of chemical into a solution.

Fully field programmable, accepts a 1-5, 4-20, or 10-50 mA signal to operate in direct or inverse mode.

Broad range of tuning pump response.



Model 5 pH

ACCESSORIES



Corporation Stop and Nozzle Assemblies

Can be cleaned or inspected without shutting down or draining the main line; available in bronze with PVC or stainless steel liquid contact parts.

Model 362

 1" NPT male connection to the main. 1/2" PVC pipe injection nozzie

Model 2638

Same as above, except with a 1" Mueller type pipethread.

Model 992

 ¾" NPT male connection to the main. 1/4" PVC pipe injection nozzie.

Liquid Level Switch

PVC tube with PVC and Viton switching elements. Unaffected by coating buildup, temperature change, or solution viscosity. Remote or tank mounted versions. Model 5250

Tank, Mounted - variable length sensor — receptacle — hi-low light.

Anti-Syphon Valves

To prevent syphoning in a "negative" pressure installation; PVC body and a special Viton diaphragm construction; universal to work with most Precision pumps. Model 3295

 ½" NPT male x ½" NPT female connections

Model 3295-1

• 1/2" O.D. tubing connections.

Pressure Relief Valves

To prevent deadheading or damage due to line blockage or excessive. pumping pressures; PVC body and molded Viton diaphragm

Model 3687

 ¼" NPT connections. Preset @ 600 psi, adjustable between 200-600 psi.

Model 3446

 ½" NPT connections, Preset @ 130 psi; manually adjustable between 50-150 psi.

Model 3446-1

• 1/2" O.D. tube connections. Preset @ 130 psi; manually adjustable between 50-150 psi.

Model 3445-2

• 5/8" O.D. tube connections, Preset @ 130 psi; manually adjustable between 50-150 psi.

Calibration Kits

Graduated polypropylene cylinder and fitting for Vie" O.D. tubing Model 4058

 500 ml graduated polypropylene cylinder and fitting for 45" NPT connection.

Model 4675

 Same as above, but for ½" O.D. tubing.

Distributed By: -

Precision Control Products

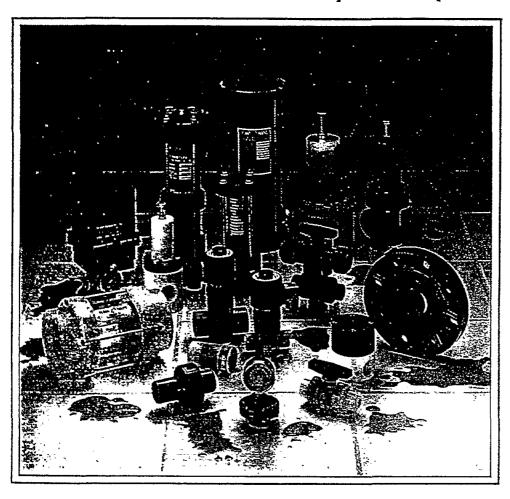
By CHEM-TECH INTERNATIONAL Inc. 92 Bolt Street, Lowell, MA 01853 (617) 453-4020 Telex: 947156

AR309418 - F-231

Printed in U.S.A.

Quality - Engineered - Thermoplastic - Valves & Controls

for corrosive and ultra-pure liquids

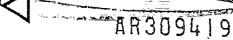


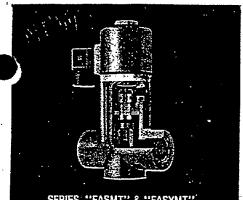
VALVES • METERING PUMPS • PIPING COMPONENTS
PVC • CPVC • POLYPROPYLENE • TEFLON® • PVDF (KYNAR®)

Illustrations are of standard product lines, however custom valve design and manufacturing are also available.



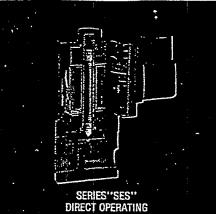
DIGEST CATALOG 20





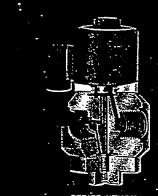
SERIES "EASMT" & "EASYMT"
DIRECT OPERATING
LON® "BELLOWS" SOLENOID VALVE

Unique Bellows design provides dynamic barrier seal. For virtually every type solution including acids, caustics, solvents and ultrapure liquids. Over two million cycles is normal. Fail-Dry concept normally closed onoff service. Sizes: 'A'', 'A'', 'A'' and 1''.



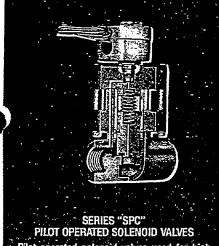
DIRECT OPERATING
"SEALLESS" SOLENOID VALVE

Major safety advance in processing of hazardous, poisonous or dangerous vapors, gases and liquids. Has no dynamic seal-eliminates leakage of fugitive emissions to atmosphere. Magnets eliminate need for activating spring. Sizes: % ", ", ", ", " and "/2" NPT.

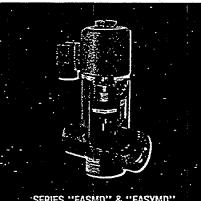


SERIES "TUC" RELIABLE 3-WAY SOLENOID VALVES

Double diaphragm diverter valves for highly corrosive or ultra-pure liquids. In-line flow pattern. Orifice diameters of 3/32", 1/8" and 1/4" with inlet pressures of 50, 25 and 18 PSI respectively with pipe sizes of 1/4" and 1/2". Also available with pneumatic operation.

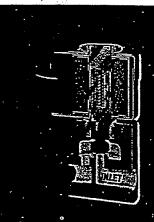


Pilot operated solenoid valves used for high pressure and high flow application. Inlet pressure range from 10 PSI to 120 PSI. Sizes ¾* to



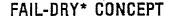
SERIES "EASMD" & "EASYMD" DIRECT OPERATING DIAPHRAGM SOLENOID VALVES

Has rolling diaphragm and FAIL-DRY* concept for normally closed on-off services of caustics and salt solutions to eliminate crystallization problems. Does not require pressure to operate. Oritice diameters from 7/16 to 11/16. Available in pipe sizes of ¼, ½, ¾ and 1".



SERIES "EUC" DIRECT ACTING SOLENOID VALVES

Single diaphragm valves for normally closed on-off service of highly corrosive liquids. In-line flow pattern. Pressure not required for operation. Orifice diameters from 1/16" to 1/4". Pipe sizes from 1/16" to 1/2"

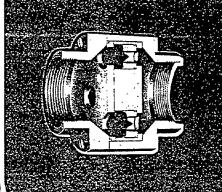


- 18

FAIL-DRY® is a Plast-O Matic patented design safety feature describing the unique concept of having a vented chamber separating two sealed sections of a valve or pump. In the event of lower (primary) seal failure, an upper (secondary) seal will continue to keep the operating media dry.

Only controls with the patented FAIL-DRY feature offer this unique protection. FAIL-DRY permits a valve or pump to remain functioning after a primary seal failure, thereby keeping the process cycle or system operating until maintenance can be scheduled. This avoids costly emergency shut-downs.

Contact your distributor or Plast-O-Matic for detailed literature.



SERIES "FC" Flow Control Valves

Automatic valves to maintain a constant flow regardless of inlef pressure changes between 15 and 100 PSI. No metal in contact with liquid. Flow rates from 24 to 120 GPM. Sizes 147



AUTHORIZED:PLAST-O-MATIC DISTRIBUTOR



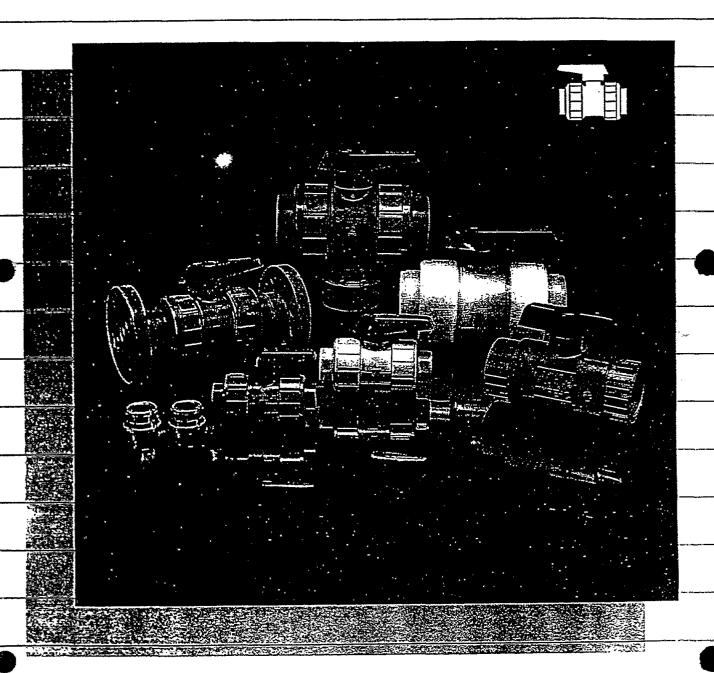
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ASAHI/AMERICA®

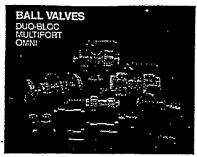
BALL VALVES



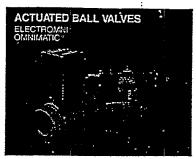


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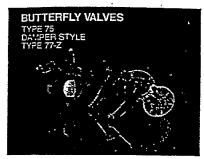
ASAHI/AMERICA THERMOPLASTIC VALVES



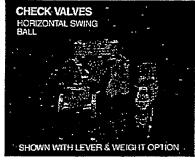
SIZES: (DUO & MULTI) 1/2"-6" (OMNI) 2/8"-3" BODIES: (DUO & MULTI) PVC, CPVC, PP, PVDF (OMNI) PVC, CPVC MODELS: SOCKET, THREADED, FLANGED, BUTT (BUTT NOT AVAILABLE ON OMNI) ACTUATORS: ELECTRIC, PNEUMATIC



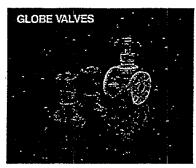
SIZES: 3/8"-2" MODELS: SOCKET, THREADED, FLANGED BODIES: PVC, CPVC SEATS: TEFLON BACKED WITH EPDM SEALS: EPDM ACTUATORS: (ELECTROMNI) 115 VAC SINGLE PHASE (OMN MATIC) PNEUMATIC DOUBLE SCOTCH YOKE



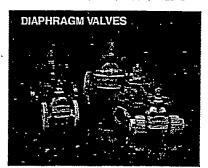
SIZES: (T.75 & DAMP) 1 1/2"-24" (T.77-Z) 2"-16" BODYDISC: (T.75) PVC, PVDF/PP, PVDF, PVC (DAMP) PVDF/PVDF (T.77-Z) KYNAR-COATED CAST IRON TEFLON* SEATS: MANY ELASTOMERS OPERATORS: LEVER, GEAR, ELECT., PNEUM.



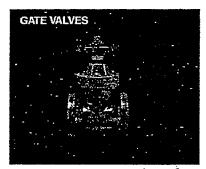
SIZES: (SWING) 3/4"-8" (BALL) 1/2"-4" MODELS: (SWING) FLANGED (BALL) SOCKET, THREADED, FLANGED BODIES: (SWING) PVC, PP, PVDF (BALL) PVC, CPVC, PVDF SEATS: (SWING) EPDM, TEF-LON, VITON® (BALL) EPDM OR VITON



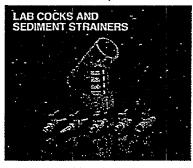
SIZES: 1/2"-4" MODELS: (FLANGED) 1/2"-4" (SOCKET) 1/2"-2" (THREADED) 1/2"-2" BODIES: PVC, PP SEAL: EPDM



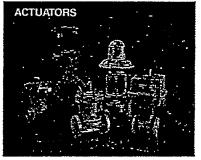
SIZES: 1/2"-10" BODIES: PVC, CPVC, PP, PVDF MODELS: (FLANGED) - ALL SIZES & MATERIALS (SOCKET, THREADED, TRUE UNION, BUTT) 1/2"-2" DIAPHRAGMS: TELLON, EPDM STANDARD -OTHERS AVAILABLE ACTUATORS: ELECT., PNEUM



SIZES: 1 1/2"-14" MODELS: FLANGED, WAFER STYLE OPTIONAL BODY: PVC WITH A PP SLIDING PLUG SEAL: EPOM ACTUATOR: ELECTRIC



SIZES: (LAB) 1/4" (STRAIN) 1/2"-4" MODELS: (LAB) ALL COMBINATIONS OF MALE OR FEMALE THREAD AND HOSE (STRAINER) SOCKET. THREADED BODIES/SEATS OR SEALS: PVC/ EPDM SCREEN: (STRAIN) 8-20 MESH PVC



ELECTRIC: SERIES 87 (REVERSIBLE) 115 VAC. SERIES 86 (UNIDIRECTIONAL) PNEUMATIC: SERIES 79 (DOUBLE RACK & PINION) SERIES P (AIR-TO-SPRING) SERIES C (AIR-TO-AIR) POSI-TIONERS & MANY OPTIONS ON ALL MODELS

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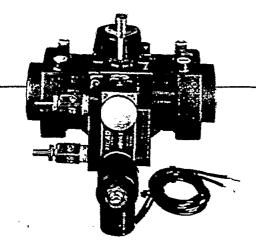
The agreement of Seller to sell its products is expressly conditioned upon the Buyer's assent to, and Seller agrees to sell its products only upon, all terms and conditions set torth above and on the face hereof. Buyer's acceptance of any products provided under this safe shall constitute such assent.

PNEUMATIC ACTUATED **BALL VALVES**

Features

Options

Dimensions



FEATURES

· Air supply pressure 80 PSI (filtered air), operating range 80-100 PSI plant air.

· Double Rack and Pinion piston actuator.

· Air to Air (double acting) or Air to Spring (spring return failsafe) models.

 Position indication through highly visible indicator knob.

· Manual override easily employed by removing indicator knob and inserting wrench onto flats of stem.

· Corrosion resistant polyester glass filled body.

Actuator shaft Series 303 stainless steel.

OPTIONS

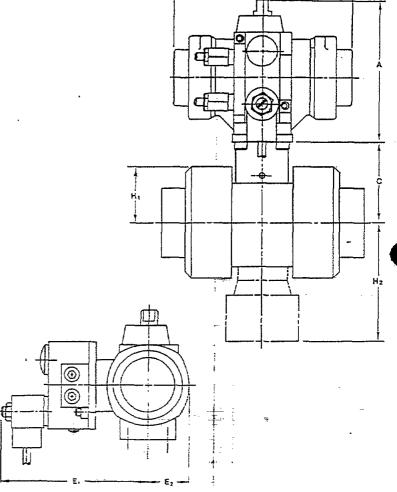
· Solenoids in all NEMA enclosures. Ratings and voltages are supplied with muffler speed control and push button override.

 Double limit switches in NEMA and VII enclosures.

· Pneumatic positioner for modulating service controlled by a 3 to 15 PSI air signal or 4-20 Ma DC signal.

Stainless steel actuator body.

 Travel Stop - independent adjustment of open and close 0-90°.



VALVE/ACTUATOR DIMENSIONS (IN INCHES, UNLESS OTHERWISE NOTED)

Model No. Air to Air	Model No. Air to Spring	Valve Size	н,	Н ₂	AA	E AS	AA	E, AS	AA	A]; AS	С	АΑ	AS
BP79PN	BP79PSN	1/2"	0.95	1.77	4.92	5.87	4,98	4.98	4.41	4.41	1.95	1.42	1.42
BP79PN	BP79PSN	¾"	1.19	2.17	4.92	5.87	4.98	4.98	4,41	4.41	2.31	1.42	1.42
8P79PN	BP79PSN	1"	1.38	2.60	4.92	5.87	4.98	4.98	4.41	4.41	2.46	1.42	1.42
вр79РМ	8P79PSN	114"	1.57	A	4.92	5.87	4,98	4.98	4.41	4.41	2,92	1,42	1.42
BP79PN	BP79PSN	11/2"	1.87	3.86	4.92	5.87	4.98	4.98	4.41	4.41	N: 1	1.42	1.42
BP79PN	CP79PSN	2"	2.09	4.45	4.92	8.74	4.98	5.21	4.41	5.00	N: 2	1.42	1.85
BP79PN	CP79PSN	21/2"	2.62	_	4.92	8.74	4.98	5.21	4.41	5.00	5.12	1.42	1.85
CP79PN	DP79PSN	3"	2.99	6.14	7.00	11.50	5,21	5.80	5.00	6.50	5.50	1.85	2.36
CP79PN	DP79PSN	4"	4.13	7.62	7.00	11.50	5.21	5.80	5.00	6.50	6.88	1.85	2.36

AA - Air to Air AS - Air to Spring. PEG = polyester glass filled, P in actuator code prefix series 79 indicates plastic PEG actuator.

A Consult factory.

N: 1 Dimension C for 2-way 1½" valve is 3.46 and for multiport valve is 3.85. N; 2 Dimension C for 2-way 2" valve is 3.67 and for multiport valve is 4.00.

AR309423

AMERICA

DUO BLOC® TRUE UNION BALL VALVES

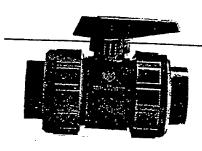
Features, Options

Sample Specifications

Parts

Pressure vs. Temperature

Dimensions



SPECIFICATIONS

SIZES: 1/2"-6" *

MODELS: Socket, Threaded, Flanged (ANSI),

Butt

BODIES: PVC, CPVC, PP, PVDF SEATS: Teflon® backed with EPDM or VITON® SEALS: EPDM or VITON®

FEATURES

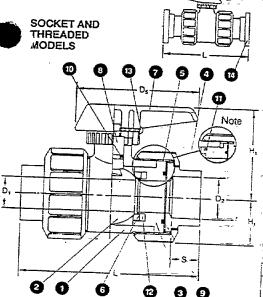
- True Union design eliminates the need for flanges and permits installation or repair without expanding the pipeline.
- Blocks in two directions, upstream and downstream, leaving full pressure on the opposite end of the valve.
- One-piece, capsule feature (PVC and CPVC models, 1/2" - 2") prevents overtightening of seating components.
- Teflon seats with elastomeric backing cushions ensure bubble tight shut off and a low fixed torque, while at the same time compensating for wear.
- Available with EPDM-or Viton® "O" rings.
- All sizes rated for full vacuum service.
- Threaded-in carriers on all sizes of PVDF and PP models and on 21/2" - 4" size of CPVC and PVC models prevents overtightening of seating components.
- Two sets of end connectors (socket and threaded) included with all PVC and CPVC models in 1/2"-2" sizes. This reduces by up to 50% ball valve inventories.
- Valve capsule guaranteed for 2 years when used as recommended.

OPTIONS (See options under Multiport valves)

SAMPLE SPECIFICATIONS

All thermoplastic ball valves in sizes 1/2" through 4" shall be of a true union design with two-way blocking capability. PVC and CPVC True Union Ball Valves (sizes 1/2" through 2") shall be of a one piece capsule. All PVC and CPVC True Union Ball Valves (sizes 1/2" through 2") shall include both socket and threaded end connectors. All True Union Ball Valves shall have Teflon" seats with elastomeric backing cushions of the same material as the valve seals. True Union Ball Valves must carry a 2 year guarantee, as manufactured by Asahi/America, Inc.

FLANGED MODEL**



PARTS

No.	Parts Parts	Pcs.	Materials
1	Body	1	PVC, CPVC, PP, PVDF
2 .	Sall	 	PVC, OFVC, PP, PVDF
3	Carrier	 	PVC, CPVC, PP, PVDF
4		2	PVC, CPVC, PP, PVDF
5.	Connector	2	PVC, CPVC, PP, PVDF
	Union Nut	2	PVC, CPVC, PP, PVDF
	Bali Seat	2	Teffon [©]
	Handle	1	ABS
8	Stem	1	PVC, CPVC, PP, PVDF
9 /	Face "O" Ring	2	Viton® EPDM
22.10	Stem "O" Ring	1	Viton® EPDM
. 11	Carrier "O"Ring	2	Viton® EPDM
12	Seat Cushion	2	Viton® EPDM
-13 <u>i</u>	Screw	1 1	Stainless Steel
14	Flange	1 2	PVC CPVC PP PVOE

Note: PVC and CPVC models, size 2¹/₂, 3" and 4", and all PP and PVDF models feature threaded-in carriers.

PRESSURE VS. TEMPERATURE (PSI WA

-		5345		THE CALL	או טועני	⊋ (PSt, N	ATER, N	ion-sho	DCK)				
		PVC		CPVC				PP	******	·	PV	25	
	Síze	30°F	30°F			9100	_500	<u> </u>			PV	UF	,
i		120°F		140°F	17595	40000	,			-5°F			
- 1	1/2-2"		-1			195 4	85°F	140°F	175°F	140°F	175°F	195°F	21017
-	-	150	150	120	35	_ 55	150	85	60	150	120	110	85
Ĺ	21/2-6"	150	150	20	. 85	55	150	70				110	;
i	1 ** ** +	Form Moreon (2 k W)	1 4	T-17 - 18 - 18 - 18 - 18 - 18 - 18 - 18 -			100	4.0	40	150	120	110	85 -

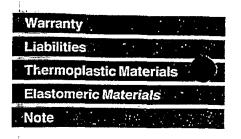
DIME	NSIONS	IN INCHES		* - ******** * r	21/2-6	1.00.1	150 120 150 20	<u>85</u> <u>8</u> 5	55 150 55 150	85 70				10 85
	Weight Socket/ Threaded (lbs.)	Weight Flanged (lbs.)	D,	D,	D, Threaded	S Socket	L Butt	L Socket	L	Flanged PVC/ CPVC/	- ,a	H,	Н,	C. Values Gal./Min. @ 1 PSI Pressure
3/4"	0.38	2.00	0.59	0.85	NPT 1/2	0.69	Fusion 4.57	3.86		PP/PVDF			<u> </u>	Drop
1"		2.25	0.79	1.05	NPT 3/4	0.72	5.00		3.82	5.63	2.76	1.97	.95	11.9
11/4"	1.00	2.50	0.98	1.33	NPT1	0.87	5.35	4.53	4.65	6,77	3.54	2.24	1.19	30 0
	1.39	3.25	1.22	1.67	NPT 11/4			5.28	5,35	7.36	3.94	2.64	1.38	46.8
11/2"	2.18	4.00	1,57	1.91	NPT J 1/2	0.94	6.00	5.83	5.87	7.48	4.13	3.07	1.57	80.0
2"	2.93	4.75	2.01	2.39	NPT2	1.09	6,29	6.65	6.69	8.35	4.53	3.35	1.87	140.0
21/2"	4.86	8.50	2.28		NPT 21/2	1-16	7.04	7.56	7.76	9.21	5.12	3.74	2.09	185.0
3"	8.07	13.00	2.76	3.52		1.75	9.70	9.45	8.46	10.20	5.91	4.45	2.62	320.0
4"	21.00	33.00	3.54		NPT 3	1.87	11.63	11.10	10.39	11.97	8.66	5.12	2.99	430.0
3	'6' Ball	Valve is ventu		4.52 n 4" See Pa	NPT 4	2.00	14.85	13.90	14.17	14.65	11.02	6.54	4.13	720.0

*6" Baff Valve is venturied up from 4"
*See Page 10 for details. See Page 14.

AR309424

ASAHI/AMERICA

BALL VALVES continued



Due to our policy of continuous product improvement, we reserve the right to change modify design without incurring any obligation to furnish or install such changes or modific tions on products previously or subsequently sold.

WARRANTY

THE SALE BY ASAHI/AMERICA, INC. OF ITS PRODUCTS IS EXPRESSLY CONDITIONS UPON AND SUBJECT TO ALL TERMS AND CONDITIONS SET FORTH ON THE BACK COVE OF THIS CATALOG.

Thermoplastic Materials

PVC (POLYVINYL CHLORIDE) TYPE 1, GRADE 1 Asahi/America uses an unplasticized Pv polymer in all of its PVC valves. This material has an excellent chemical resistance, strengt rigidity, and modulus of elasticity. It resists attack by most acids and strong alkalis, as well: gasoline, kerosene, aliphatic alcohols and hydrocarbons, and salt solutions. Aromatic chlorinated organic compounds, and lacquer solvents do have effect upon PVC's chemic properties. Its temperature range is 140° F. PVC's low cost and overall balance of propertimake it the material best suited to the widest number of corrosive applications.

CPVC (CHLORINATED POLYVINYL CHLORIDE) TYPE 4, GRADE 1 The properties CPVC and its advantages are very similar to those of PVC; however, its working temperaturange is higher (200° F.) than that of PVC. It should be specified in some instances when corrosive liquids are being handled and an extra margin of safety is required.

PP (POLYPROPYLENE) TYPE 1 Polypropylene, a member of the polyolefin family, i one of the lightest plastics known. It is highly crystalline, thus is strong and hard. It possess excellent chemical resistance to many acids, alkalies and organic solvents. PP is not recormended for use with chlorinated hydrocarbons and aromatics. Its upper temperature limits slightly lower than that of CPVC.

PVDF (POLYVINYLIDENE FLUORIDE) PVDF is a high modular weight fluorocarbon the has superior abrasion resistance, chemical resistance, dielectric properties, and mechanic strength. The remarkable fact is that it maintains these characteristics over a temerature range of -40° F, to 250° F. PVDF is highly resistant to wet or dry chlorine, bromine and oth halogens, most strong acids and bases, aliphatics, aromatics, alcohols, and chlorinate solvents. It is not, however, recommended for ketones or esters. Asahi/America's PVDF resconforms with FDA No. 177.2510 requirements for contact with food.

Elastomeric Materials

TEFLON³ (TFE FLUOROCARBONS) This fluorocarbon is almost totally insoluble at chemically inert. Teflon³ in application on bearing surfaces exhibits a natural lubricity the makes lubrication completely unnecessary. It has a very high thermal stability, is nonflar mable, and exhibits a very low dielectric constant.

VITON° Viton° is a fluoroelastomer which is used as an "O" ring seal in many Asal America valves. It resists a wide range of chemicals, including mineral acids, salts a chlorinated hydrocarbons. The maximum temperature is 250° F.

EPDM (ETHYLENE PROPYLENE TERPOLYMER) This elastomer is particularly suit to valve seats and "O" ring seals. It can stand up to a wide variety of acids, bases. Fichols, and oxidizing chemicals. The maximum temperature is 212° F.

Note

Caution: Asahi/America valves are not recommended for use in compressed air When testing, only hydrostatic pressure testing is recommended with a gradual increase pressure.

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Introduction
Discussion
Warranty
Liabilities

- duction

For over 15 years Asahi/America has been at the forefront of thermoplastic valve technology. The Asahi/America line is now the broadest in the industry in terms of size range, valve types, materials, features, and options. Advanced molding techniques, rigid engineering standards, and a wide choice of corrosion resistant thermoplastic and elastomeric materials ensure the highest level of reliability for all Asahi/America valves, even in the most severe corrosive applications.

The valves in this catalog represent one segment of the Asahi/America line. Other valves are grouped according to type or special function in separate catalogs. On the back cover of this brochure you will find a brief representation of the complete product line as an aid to requesting additional information.

If, however, you have a requirement for a valve with features not contained in any of our literature, please contact our engineering department to discuss our custom fabrication capability. Chances are we have already encountered a similar request and can accommodate your special needs with a minimum of effort.

This valve performs an on/off or modulating function and its name is derived from the flowcontrolling ball located within the body of the valve. A hole through the center of the ball along one axis connects the inlet and outlet ports of the body. The ball itself is held in place by, and rotates 90° within, Teflon® seats which provide permanent lubrication and keep the valve "bubble tight". Teflon seats are backed by an elastomeric cushion which provides pressure of seats against ball and at the same time compensates for wear. Elastomer "O" rings are used for stem and carrier seals to prevent leakage to the atmosphere. In the open position the flow is straight-through and there is no pressure drop when the porting through the ball is the same size as the inside diameter of the pipe. Asahi/America ball valves are quick opening and closing, a quarter turn is all that is necessary. They are easy to maintain, and they give tight sealing with low torque. Asahi/America offers three major types of ball valves: (1) True Union Ball Valves; (2) Omni® Ball Valves; and (3) Multiport Ball Valves. True Union Ball Valves can be lifted from the line-without having to move the pipingsimply by loosening the two union nuts; the valve can be disassembled, and parts may be replaced. Asahi/America's Omnio series are economical, one-piece valves which cannot be taken apart, Multiport Ball Valves are three-way ball valves with True Union design on the left and right ports and fixed molded bottom port.

The use of Multiporting Ball Valves simplifies piping and eliminates the need for an additional valve and Tee fitting because an "L" ported ball permits flow from the bottom entry to either the left or right ports or to an OFF position. An optional Tee ported ball allows simultaneous left and right flow. Asahi/America's True Union Ball Valves and Multiport Ball Valves may be electrically or pneumatically operated.

Asahi/America's thermoplastic valves provide a dependable and economical way to handle corrosive chemicals like sulfuric and hydrofluoric acid, nitric acid, and other oxidizing chemicals, as well as caustics, solvents, halogens and other problem materials, at temperatures to 250°F, pressures to 150 PSI and flows up to 18,500 gpm. When we speak of corrosion resistance, we refer to the ability of a material to withstand physical and chemical deterioration when it reacts with its environment, and particularly with oxygen. Corrosion, itself, has become a term which applies mostly to metals because the process is primarily an electrochemical one. There is ionization or corrosion at the surfaces due to electrical potentials that are created between positive and negative poles formed when unlike metals are joined in the same electrically conductive medium or when fluids that surround the metals have different ionic concentrations. Because thermoplastics are dielectric, meaning that they cannot easily support a charge, they are practically immune from corrosion in the conventional sense. There are some chemicals that can cause thermoplastics to deteriorate. For this reason, we have a thermoplastic chemical resistance chart, which we will be happy to send you upon request.

To the best of our knowledge the information contained herein is accurate. However, neither Asahi/America, Inc. nor any of its affiliates assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of the suitability of any information or material for the use contemplated, or the manner of use, is the sole responsibility of the user.

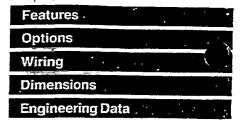
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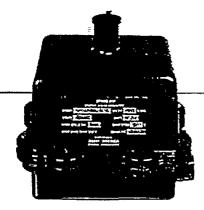
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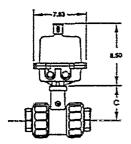
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ELECTRIC ACTUATED TRUE UNION BALL VALVES

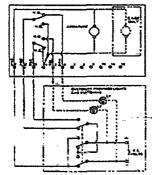




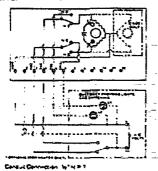
ELECTRIC SERIES 87



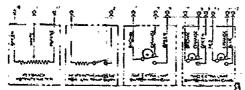
DC WIRING



AC WIRING



ACTUATOR OPTIONS:



FEATURES

- Reversing type motor, 115 VAC, 50/60 Hz, single phase.
- Brushless, capacitance-run motors (AC models).
- · Integral thermal overload protection with auto-reset (AC models).
- Permanently lubricated gear train.
- Thermally-bonded epoxy powder coating inside and out.

OPTIONS

- Limit Switches 2 Additional limit switches may be mounted in the Series 87 for interlocking other equipment, such as pumps, compressors, mixers, or other valves.
- Feedback Potentiometer When control operation or position feedback information is needed, a 1000 ohm, 1 watt potentiometer with 5% linearity may be installed. A 75% duty cycle motor is required if the actuator is to be used in modulating service.
- Heater & Thermostat For operation at low ambient temperature (to -40°F). The combination of heater and thermostat will maintain the temperature of the case at 40°F. When specified in the valve/actuator package, heater and thermostat come internally wired.
- Housings—NEMA I (General Purpose) and NEMA VII (Hazardous Location).

- · Declutchable manual override easily employed by pulling up on Indicator Knob and inserting wrench onto flats of stem.
- Standard travel-stop limit switches can simultaneously be used for light indication.
- NEMA IV (Weatherproof) Housing.
- Corrosion resistant mounting kit specially engineered for Asahi/America valves.
- Duty cycle: 25% at 5 seconds.

Milliamp Positioner

An all solid state electronic positioner can be installed inside the housing of the Series 87, 75% duty cycle actuator. Standard 4-20 milliampere input signal, with 1-5 and 10-50 milliampere signals also available. Resistance-type 1000 or 135 ohm circuits optional. The positioner gives you low cost, all-electric modulating control capability. Separate NEMA I, NEMA IV. and NEMA VII housings also available (110 VAC only).

 Cycle Length Control Module For extended cycle times, this control module can permit field adjustment of cycle times up to 10 minutes.

 Voltages—230 VAC, 12 VDC, 24 VDC, 24 VAC, 12 VAC.

 Duty Cycles 10% at 2.5 seconds 25% at 7.5 seconds 75% at 15 seconds and 22.5 seconds.

DIMENSIONS (IN INCHES)

Size	· - c	Reversing Model No.	Čycle Time
'/a" .	2.75	. A87WJ	5 sec.
742"	2.75	A87WJ	5 sec.
1"	- 2.75	- A87WJ	5 sec.
11/4"	3.85	:A87WJ	5 sec.
1'h"	3.85	,A87WJ	5 sec.
2"	4.00	:A87WJ	5 sec.
21/2"	4.30	B87WJ	5 sec.
3″	5.25	B87WJ	 7¹/₂ sec.
4"	6.00	B587WJ	71/2 sec.
6"	4.13	B587WJ	71/2 sec.

Operator width 6 557 weight 9 25 pounds

			Curr (am			÷- :	Cycle Time	Weight (lbs.) Waterproof Explosion-
Size	115 VAC	12 VAC	230 VAC	24 VAC	12 VDC	24 VDC	(seconds)	Proof
Α	.5	5.9	45	2.9	1.0	.5	2,5, 5, 15	9.2
A5	.6.	5.9	.45	2.9	1.0	.5	4, 7.5, 22.5	9.2
В	.85	5.9	.45	2.9	1.0	.5	2.5, 5, 15	9.6
85	85	5.9	45	29	1.0	5	4.7.5.22.5	9.6

Current Rating

पुर oning under no load. Fuil load FC current is essentially the same. <u>Max. ÖC current (locked rotor) is as follows. A and B sees</u> 5 उन्हेंटड, <u>जे २५ VDC, 6 amps. C size at 12 VDC is 15 amps. at 24 VDC, 12 amps.</u> For actuator ru



Bondstrand® Product Data

Series 2000 Fiberglass Pipe and Fittings

for general industrial service

rvice 02996

Uses and applications	Waste water and sewage systems Potable water lines Chemical process piping Food processing plant piping Drainage systems Cooling water piping Deionized water systems Jet fuel and liquid petroleum piping Jet engine air start systems Piping systems for alkalis and nonoxidizing acids General industrial service for moderately corrosive liquids					
Listings	Mil-P-29206A for jet fuel and petroleum liquids.					
	U.S. Federal Regulations 21 CFR 175.105 and 21 CFR 177.2280 for conveying foodstuffs when joined with Bondstrand RP-6B epoxy adhesive.					
Performance	Excellent corrosion resistance over a wide temperature range.					
	Weighs 1/6 as much as steel.					
	Does not require thrust blocks at ambient operating temperatures when properly installed.					
·	Smooth inner liner produces extremely low frictional loss for greater discharge and reduced pumping costs.					
	Low thermal conductivity ($\frac{1}{100}$ th of steel) minimizes heat losses.					
Joining systems	Quick-Lock® configuration for adhesive-bonded joints featuring integral pipe-stop for predictable, precise laying lengths.					
	Flanges and flanged fittings.					
	Key-Lock® self-retrained mechanical joint, utilizing an O-ring seal and offering quick assembly by inserting locking keys between bell and spigot.					
	Pronto-Lock® and Pronto-Lock its heavy duty, threaded mechanical coupling system using an O-ring seal.					

Typical pipe dimensions and weights		minal e Size	Pip	e ID		nal Wall mess*	Aver Section	age** nal Area	Pipe	Weight
	(in)	(mm)	(in)	(mm)	(in)	(mm̄)	(in²)	(mm²)	(lb/ft)	(kg/m)
	1	25	1.07	27	.140	3.5	0.50	323	0.4	
 .	11/2	40	1.67	42	.140	3.5	0.80	516	0.7	
	2	50	2.10	53	.157	4.0	1.13	730	0.9	1.5
	3	80	3.22	82	.157	4.0	1.70	1100	1.2	1.3
	4	100	4.14	105	.203	5.2	2.73	1760	2.0	3.0
	6	150	6.26	159	.203	5.2	4.06	2620	3.0	4.5
	8	200	8.22	209	.226	5.7	5.83	3760	4.3	6.4
	10	250	10.35	263	.226	5.7	7.31	4710	5.4	8.1
	12	300	12.35	314	.226	5.7	8.69	5600	6.4	9.5
	14	350	13.56	344	.238	6.Ò	10.32	6660	7.4	11.0
	16	400	15,50	394	.269.	6.8	13.33	8600	9.5	14.2

^{*}Minimum wall thickness shall be not less than 87.5% of nominal wall thickness in accordance with ASTM D-2996.
**Use these values for calculating longitudinal thrust

Typical pipe performance		ominal se Size	Internal Pressure Rating*		External Pressure Rating**		Designation per ASTM D2996
	(in)	(mm)	(psig)	(MPa)	(psig)	(MPa)	
	1	25	450	3.10	945	6.52	RTRP-11FE-111:
	11/2	40	450	3.10	280	1.93	RTRP-11FE-111
•	2	50	450	3.10	210	1.45	RTRP-11FE-111
	3	80	425	2.93	135	0.93	RTRP-11FE-111
	4	100	400	2.76	150	1.03	RTRP-11FE-111
	6	150	300	2.07	45	.031	RTRP-11FE-111
	8	200	250	1.72	<u>:</u> 30	0.21	RTRP-11FE-111
	10	250	200	1.38	- 14	0.97	RTRP-11FE-111
	12	300	170	1.17	8	0.55	RTRP-11FE-11
	14	350	165	1.14	8	0.55	RTRP-11FE
	16	400	165	1,14	.8	9.55	RTRP-11FE-111

^{*}At 200°F using Bondstrand RP34B adhesive. For sustained service above 200°F, reduce rating linearly to 50% from 200°F to 250°F.

^{**}At 70°F. Reduce linearly to 90% at 150°F, 80% at 200°F and 65% at 230°F.

	ominal se Size	Stiffness	Factor*	Pipe S	tiffness	Beam N	Moment ertia**
(in)	(mm)	(lb·ĭn)	(N·m)	(þsi)	(MPa)	(in4)	(mm ⁴)
1	25	770	87	26400	182	0.09	0.03
11/2	40	1610	182	17200	119	0.36	0.15
2	50	620	70	2900	20.0	0.59	0.24
3	80	620	70	860	5.93	1.99	0.82
4	100	1360	154	890	6.14	5.50	2.29
6	150	1360	154	270	1.86	18.1	7.53
8	200	1890	214	170	1.17	45.1	18.8
10	250	1890	214	86	0.59	88.6	36.9
12	300	1890	214	- 51	0.35	149	62.0
14	350	2230	252	46	0.32	208	86.6
16	400	3250	367	45	0.31	353	147

^{*}Per ASTM D2412.

[&]quot;Use these values for calculating permissible spans.

PermAlert ESP

DOUBLE OUK

Modular Thermoplastic Double Containment Piping Systems

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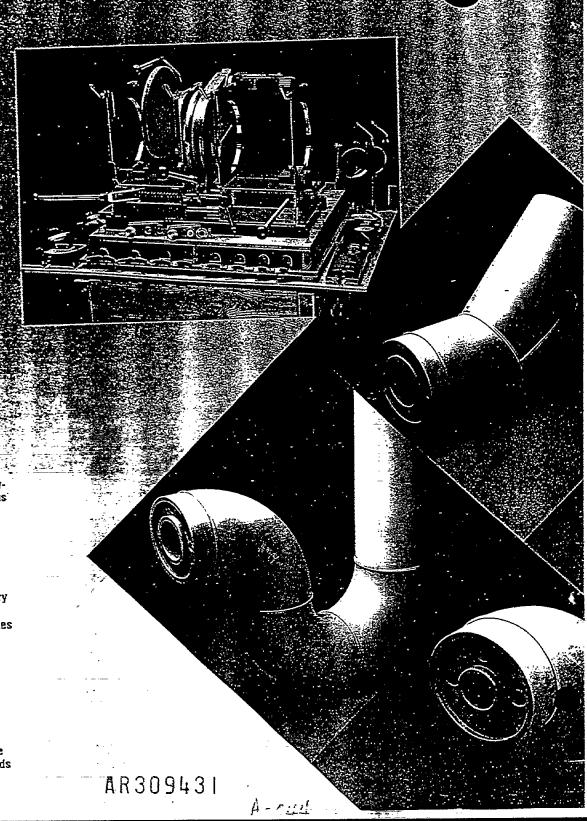
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The Double Quik PP poly-propylene piping systems can be used for a wide grange of applications including:

- Process Lines
- 主**軍** Process Sewers
- Acid Waste Systems
- . Groundwater Recovery Systems
- Solvent Recovery Lines
 - Effluent Lines
 - Acid and Caustic Transfer Lines
 - Waste Water Lines

Polypropylene has outstanding chemical resistance and can be used to transport most organic solvents, dilute acids, many strong acids and alkalis.



Double Quik Sizes and Pressure Ratings

Nominal Pipe Size		Pressure Ratin	gs (PSI) @ 73 49E - 3	
	Carrier 7Containment		Carrier Containment	
	The American Colon Control of the Colon Co		SDR17.6 SDR17.6 (PN6)	SDRIZG SS SDRG25
Carner Containment	(PN10) (PN6) 532	(PN10) (PN3:2)	(PNO) SAMES (PNO)	English Carrier
4.5	150	150 45	2 90 (2 2 2 2 90) 4 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	25,890,200,700,45,45,45,47
0.4556-666 946 P.	784150	150 8 25 45	90 2 390	20 - 5 - 5
1-124-14-14-14-15-15-15-15-15-15-15-15-15-15-15-15-15-	35150 353 290	1507 6 45	90 590	2 200 10 20 24 24 25 25 25
2008-000-667-12	Ca(50 = 222 890 G 288	150 25 45	90	200 PARTIES ASSESSED.
2599930 26th 12	- 350 352390 36	150 45	90 90 90 90	\$405.903 49465 \$4645 \$4645
4350 36E2 36E2	H50 90 90	150 45	#590 SERVESON	262 90 863 26 28 29 25 864 S
493 -631 -87	3150 36 90 56	150 45	290 - 200 - 200 - 190 -	15 250 25 PC 10 10 15 RC 10 VA
6061630 - 5071	3450 250-290 250	150 45	90 2 290	90 30 44 50 25 43 5
856.202 (25.75	150	150 45 45	32.90 20 20 20 20 30 30 30 30 30 30 30 30 30 30 30 30 30	\$6500 BENEVAL 548
1034-325-146-33	150 20 490 6 23	150 5 45	330290	53 C 0 28 S 48 S 42 5 8 S 5
J12 33 3 165 - 5	150: \$3 .0.90	150 25 45	290 29 190 24	TO A TRANSPORT OF THE PARTY OF
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e will not accept cable type leak detection/location



PALAT LEAK DETECTION/ LOCATION

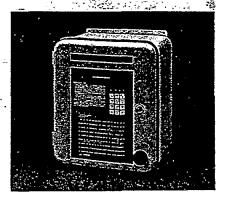
This advanced, simple to operate system continuously monitors the piping system for leaks that may be caused by unforeseen events. In the event of a system problem, PAL-AT will identify the problem and tell you, via LCD readout, its location and nature.

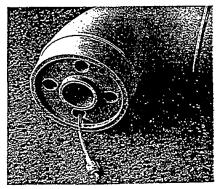
A variety of sensor

A variety of sensor cables and probes can be connected to the PAL-AT in one continuous string to monitor for the presence of any liquid.

Combine PAL-AT leak

Combine PAL-AT leak detection and location system with your Double Quik PP system and have the ultimate in environmental protection.





AR309432

GENERAL

The Secondary Containment Piping for the lines shall be factory manufactured and fabricated by a manufacturer that has at least 5 years experience in the production of secondary containment piping. All straight sections, fittings and other accessories shall be factory manufactured and prefabricated to allow for the placement of the leak detection cable in the secondary containment. The containment shall be drainable and air pressure testable.

All secondary containment piping shall be equipped with a PAL-AT leak detection/location system supplied by the manufacturer of the Secondary Containment piping.

A factory trained field representative of the Secondary Containment piping manufacturer shall provide technical field support during critical periods of installation including the final check out of the PAL-AT leak detection/location system.

CARRIER PIPE AND SECONDARY CONTAINMENT MATERIAL

Carrier pipe and secondary containment shall be type I Homopolymer Polypropylene in accordance with ASTM F4001. All pipe shall be stress relieved (annealed) by a post extrusion annealing process to insure that the pipe material will have increased impact resistance, longer life, low shrinkage and dimensional stability required for the butt fusion welding process. Carrier and containment pipes will be manufactured to an SDR (Standard Dimensional Ratio) so that the pressure rating of the pipe will be consistent for all pipe sizes. SDR's and Pressure Ratings shall be as follows: (select one)

Carrier P	ipe	Secondary Containment Pipe			
Wall Thickness	Pressure Rating	Wall Thickness	Pressure Rating		
SDR 11 (PN10) SDR 17.6 (PN6)	150 psi 90 psi	SDR 11 (PN10) SDR 17.6 (PN6) SDR 32.5 (PN3.2)	150 psi 90 psi 45 psi		

FITTINGS

All fittings shall be factory manufactured. Unless otherwise indicated secondary contained fittings shall be constructed using injection molded fittings and shall have the same pressure rating as the corresponding straight pipe. All secondary contained fittings shall be unitized construction with the carrier and containment integrally anchored together to prevent movement of the carrier relative to the containment within the fitting. Anchors shall be of sufficient thickness to withstand the maximum possible end loads that can be generated by the carrier pipe during the life of the system. Bends must be anchored on both ends. Tee's and laterals must be anchored on both the run and the branch connections.

PIPE SUPPORTS

Supports shall be designed and factory installed by the secondary containment manufacturer. The manufacturer shall design and fabricate the system so that the pipe is continuously double supported in order to minimize the stresses due to point loading. All pipe supports shall be circular and welded to the carrier pipe. The supports at both ends of every straight section shall be welded to both the carrier and containment pipes in order to facilitate the simultaneous welding of all secondary contained

pipe and fittings. Support clips will not be allow

FACTORY WELDED JOINTS

All factory joints shall be Butt Fusion welded in accordance with ASTM 2657 Section 9. Weld pre sures, temperatures and time shall be in accorda with the manufacturers recommended procedure All carrier and containment joints shall be sized neously welded.

FIELD WELDING MACHINE(S)

Field welding of the Secondary Containment syst shall employ the simultaneous welding methe if all Carrier and Secondary Containment pipe and fittings. The system manufacturer shall supply all Butt Fusion welding equipment for all field weld. The Butt Fusion welding equipment shall include clamps and mirrors required for the simultaneou welding of the system while the leak detection/location cable is in place. Hot air or extrusion we shall not be used to seal or join either the carrie pipe or secondary containment.

SYSTEM MANUFACTURER

Secondary Containment System shall be Double Quik.

Leak detection/location system shall be PAL-AT. Welding equipment shall be Quik Welders.

System manufacturer shall be PERMALERT ESP of NILES, ILLINOIS (708) 966-2190.

ALTERNATES

Alternate systems must comply with this specific tion and be submitted for approval 10 days and bid date.

PAL-AT™

The leak location/detection system shall consist of microprocessor based monitoring unit(s) capable of continuous monitoring of a sensor string for leaks/faults. The unit shall have a sensing range of (2000) (5000) feet. The alarm unit(s) shall operate on the principle of pulsed energy reflection and be capable of mapping the entire length of the sensor cable and storing the system map in nonvolatile memory. The alarm unit(s) shall include watchdog circuitry to monitor proper functioning of the system software.

The leak location/detection system shall be capable of monitoring the entire sensing string for additional leaks after proper acknowledgement of a current leak. The system shall be capable of accounting for minor installation irregularities, static moisture and puddles (such as condensation) with no loss in accuracy or sensitivity. The system shall locate the point of origin of the first leak or fault within ± 1% of the distance from the last calibration point to the leak or ± 5 feet, whichever is greater. The monitoring unit shall report and record to nonvolatile memory, the type of fault, distance, date, and time of an alarm:

The system manufacturer shall have at least five years of experience with leak focation/detection sensor rable technology and provide a factory trained representative at two on-site meetings for pre-construction and sensor/electronics installation.

The alarm unit(s) shall be euclosed in a modified NEMA 12 enclosure and have a two line by forty character display providing status and alarm

data. The monitoring unit(s) (will be field connected to an) (will have a factory mounted) alarm horn. The unit shall be U.L. listed as intrinsically safe for use in Class 1, Div. 1, Groups C and D hazardous locations.

Ability to locate a leak shall not depend on battery backed-up functions. In the event of power failure, system conditions and parameters shall be stored in nonvolatile memory allowing the unit to automatically resume monitoring, without resetting, upon restoration of power.

The monitoring unit(s) power requirements shall be 120 VAC, 60 VA, 50/60 Hz, single phase. Monitoring units shall be equipped with an RS232 communication port and two SPDT output relays, rated for 125 VAC, 10 amps

The sensor cable, connectors, (probes) and jumpers shall be supplied by the manufacturer of the monitoring unit(s). The cable sensing principal shall provide for continuous monitoring while short lengths of the cable are in contact with liquids, without altering the systems sensitivity and/or accuracy. The sensor cable shall be designed to (select appropriate cable(s) for application):

AGW Detect water based fluids and shall be capable of being flushed and dried in-place and will not require replacement after a leak event of any volatile hydrocarbon of water based fluid.

AGT Detect accumulations of water-based and hydrocarbon liquids at a shallow depth of

% inch in subfloor or other flat surface applications. The cable shall be capable of being flushed and dried in-place and will r require replacement after exposure to any compatible fluid.

AGC Detect accumulations at a shallow depth of % inch and be resistant to most acids, bas and solvents and shall be capable of being flushed and dried in-place and will not req replacement after a leak event of any comp

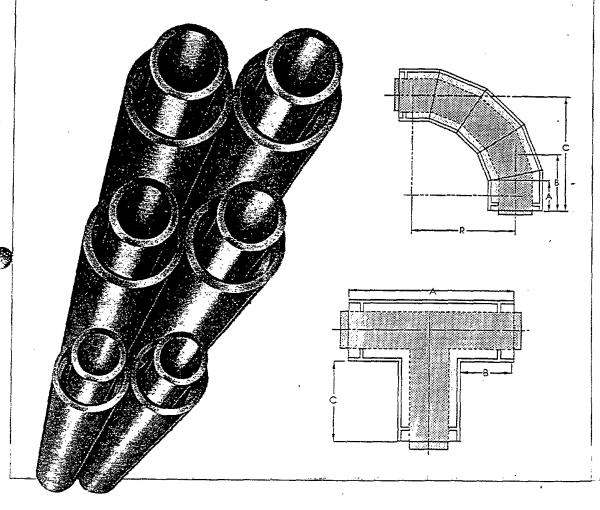
FGH Withstand 400°F and shall detect water par fluids and be capable of detecting hydrocar bons with reduced sensitivity. The cable shall be capable of being flushed and dried in place and will not require replacement after expansive to any compatible fluid.

H Detect only the presence of hydrocarloss while ignoring water and water-based fluid. The cable shall be of coaxial construction with a 14 gauge center conductor designed direct burial to a maximum cepth of 2 "fee and capable of providing a response time" not more than 4 minutes to most hydrocar liquids. The cable shall contain him of the cable shall be reusable when dried, after exposum to gasoline or other volatile hydrocarbon liquids.



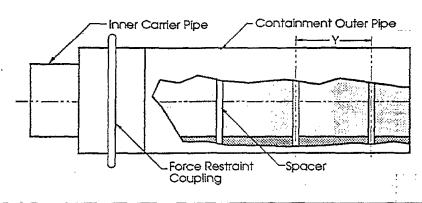
Dual Containment

Piping, Fittings, and Dimensions



AR309434

DUAL CONTAINMENT PIPES AND FITTINGS



	Size* Ca		rrier Containmer		ainment .	Pressure Rating	Pressure Rating	Centralizer
	(Inches)	O.D.	I.D.	O.D.	Carrier		Containment Pipe	Spacing "Y" (inches)
والمراورة والمرا	1/3 1.5/4 2/4 3/6 4/8 6/10 8/12 10/14 12/18 14/20 16/21.5 18/24 20/28 21.5/30	1.315 1.9 2.375 3.5 4.5 6.625 8.625 10.75 12.75 14.0 16.0 18.0 20.0 21.5	1.075 1.554 1.865 2.864 3.682 6.115 7.961 9.924 11.770 12.924 14.770 16.616 18.462 19.846	3.5 4.5 4.5 6.625 8.625 10.75 12.75 14.0 18.0 20.0 21.5 24.0 28.0 30.0	2.864 3.682 3.682 6.115 7.961 10.088 11.966 13.138 16.892 18.77 20.176 22.524 26.276 28.154	160 160 160 160 160 64 64 64 64 64 64 64 64	110 110 110 64 64 50 50 50 50 50 50	36 37 40 14 20 35 44 53 60 66 70 75 80 84
L	24/31.5	24.0	22.154	31.496	29.558	. 64	50_	89

Other sizes available upon request.

ıd

Pipe dimension shown for gravity flow to 50 PSI.

FLUID CONTROLS, INC.

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AR309435 A -242

Carier and containment pipe SDR 32.5 and piece welded to carrier and containment pipe to prevent movement. Centralizers spaced to control deflection during expansion and prevent sagging.